SOVIET GEOGRAPHY:

REVIEW & TRANSLATION

DECEMBER 1961

Published by
AMERICAN GEOGRAPHICAL SOCIETY
Broadway at 156th Street, New York 32, N.Y.

Vol. II No. 10 December 1961

Soviet Geography: Review and Translation

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This translation and publication project was undertaken by the American Geographical Society in the conviction that the dissemination of the fruits of Soviet geographic research would be a service to American geographers and would help bring about professional contacts between geographers of the two countries. The National Science Foundation encouraged the project and is supporting it by a grant.

Readers are invited to send in their comments and discussion of articles published in *Soviet Geography*. Readers are also encouraged to submit suggestions as to published Soviet geographic literature worthy of translation. Such suggestions should relate to articles of general substantive or methodological interest rather than materials of narrow, specialized appeal.

The subscription rate for *Soviet Geography* is $6 a year. The price of a single copy is $1. Address all editorial and subscription inquiries to: *Soviet Geography*, American Geographical Society, Broadway at 156th Street, New York 32, New York.

Published monthly (except July and August) at the Lane Press, 305 St. Paul Street, Burlington, Vermont, by the

AMERICAN GEOGRAPHICAL SOCIETY

Editorial and General Offices: Broadway at 156th St., New York 32, N.Y.

Price $1.00 a number $6.00 a year

Second-class postage paid at Burlington, Vermont

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Notice to Readers: Reprints of the issues Nos. 1-2, 3, 4, 5 and 6 of SOVIET GEOGRAPHY 1960, temporarily out of print, are now available.

TRANSLITERATION TABLE

Russian			English	Russian			English
А	а	*а*	a	Р	р	*р*	r
Б	б	*б*	b	С	с	*с*	s
В	в	*в*	v	Т	т	*т*	t
Г	г	*г*	g	У	у	*у*	u
Д	д	*д*	d	Ф	ф	*ф*	f
Е	е	*е*	e*	Х	х	*х*	kh
Ж	ж	*ж*	zh	Ц	ц	*ц*	ts
З	з	*з*	z	Ч	ч	*ч*	ch
И	и	*и*	i	Ш	ш	*ш*	sh
Й	й	*й*	y	Щ	щ	*щ*	shch
К	к	*к*	k	Ъ	ъ	*ъ*	"
Л	л	*л*	l	Ы	ы	*ы*	y
М	м	*м*	m	Ь	ь	*ь*	'
Н	н	*н*	n	Э	э	*э*	e
О	о	*о*	o	Ю	ю	*ю*	yu
П	п	*п*	p	Я	я	*я*	ya

(*) Instead of e, use ye at the beginning of names, after vowels and after the soft sign (').

The transliteration table is supplied for the general information of readers and to enable them to identify the geographic names on maps that will be reproduced from time to time in SOVIET GEOGRAPHY.

The transliteration system is the one proposed by the United States Board on Geographic Names. For more general use in textbooks and other popular needs, the following simplifications are recommended by the editor of SOVIET GEOGRAPHY:

1. Eliminate the use of (') and (").
2. Use i for iy, and y for yy.
3. Convert diphthongs ay, ey, oy, uy to ai, ei, oi, ui.

THE THIRD CONGRESS OF THE GEOGRAPHICAL SOCIETY OF THE USSR

THE REFORM OF THE SYSTEM OF PUBLIC EDUCATION IN THE USSR AND THE OBJECTIVES OF SCHOOL GEOGRAPHY

By N. N. Baranskiy, A. V. Darinskiy, A. I. Solov'yev

(Abstract: The authors discuss changes in the geography curriculum under the Soviet school reform of 1958, which has replaced the basic seven-year school with a basic eight-year school and has extended the so-called middle school from ten to eleven grades.)

Now that the Soviet Union is carrying out a reform of the system of public education, now that a universal, compulsory eight-year education is being introduced and middle-school education is being expanded, it is timely to examine the status of geography teaching in the schools.

"The main objective of Soviet schools," according to Article I of the law adopted by the Supreme Soviet USSR on December 24, 1958, "is the preparation of students for life and for socially useful labor, the further raising of the level of general and polytechnical education, the preparation of educated people familiar with scientific principles, and the upbringing of youth in a spirit of deep respect for the principles of a Socialist society, in the spirit of the ideals of communism.

"The leading principle of education and upbringing in the middle schools should be a close link between education and labor, between education and the practical aspects of Communist construction."

The reform of the system of public education is designed to improve the preparation of students for life and practical activities. The labor education of students, their practical and psychological preparation for labor will begin systematically in the eight-year school. After graduation from that school, all youths aged 15 to 16 years will be assigned to socially useful work. Some of the graduates will work in factories and on collective farms, while continuing their education in vocational schools or in evening schools for working and rural youths; the other part will continue studying in middle polytechnical work schools with industrial training, where in addition to general education students will receive vocational training.

In the middle schools, education will thus be combined with work in industry and agriculture. In addition the curriculum of the middle schools will include special subjects providing for the students' vocational training - "the study of general technical and technological problems, automation, complex mechanization and remote control and problems of agricultural production typical of the given factory, collective farm, state farm or group of enterprises served by the given school" (Curricula of the eight-year and middle schools of the RSFSR," Uchitel,skaya gazeta, August 29, 1959).

Of great importance in preparing students for practical activity is the polytechnical education that they receive in studying the new general technical disciplines introduced into the curriculum, such as principles of agriculture, machine construction and electrical engineering, as well as in studying the general educational subjects.

Not all the general educational subjects, however, make equally important contributions to polytechnical education. The principal role is played by such subjects as physics, chemistry, biology and mathematics. The importance of geography in polytechnical education lies mainly in teaching concrete information on the location and combination of economic activities in various countries and regions.

Geography, like history and literature, plays an extremely important role in the general education of students and in developing their philosophy of life. That is precisely where geography is called upon to play its principal part in the educational system.

We know that the objective of insuring the students' upbringing for labor, their vocational training and polytechnical education in no way reduces the importance of their general education and of their Communist upbringing. On the contrary, the reform of the system of public education opens even greater possibilities for general education and the upbringing of students. "For the transition to communism," said N. S. Khrushchev at the 21st party congress, "we need not only a sufficiently developed material and technical basis, but a high level of consciousness on the part of all citizens of society. The higher the consciousness of the millions of masses, the more successfully will the plans of Communist construction be fulfilled. Hence the extreme importance that is now being attached to problems of Communist upbringing of the working people, especially of the new generation."

In geography courses students become familiar with the properties and laws of development of the environment, its diversity in different regions of the USSR and other countries, the population and economy of the USSR, and the population, economy, political systems and political situation in other countries of the world. This knowledge should help students think about and understand the laws of development of nature and of the economic life of people, and should help them independently to understand international affairs and current events both in the Soviet Union and abroad.

The knowledge acquired by students in geography courses is also important for their general development as conscious participants in the construction of communism.

In the process of studying geography, students become familiar with maps and learn how to read and understand them, which is just as important for an educated person as reading and writing. The ability to work with statistics and to understand economic indices, and familiarity with economic terminology and other economic questions, all this knowledge, which stu-

dents acquire in geography courses, is part of the elementary minimum that every educated person must know.

The role that geography plays in the upbringing of students in a spirit of Soviet patriotism and internationalism is well known. Anyone who carries on political propaganda and agitation knows very well that the best concrete factual material is furnished by economic geography (achievements of the economic development of the USSR, comparisons with the past and with capitalist countries).

There can be no doubt that it is this aspect of geography in general education and in the upbringing of students, rather than its relatively modest contribution to polytechnical education that determines its role in Soviet schools. A desire to make geography at any cost one of the basic subjects in polytechnical education introduces into geography courses many extraneous problems related to biology and technology to the detriment of precisely those questions that constitute the real content of a geographical education and determine the role of geography in the schools.

Moreover, such an attitude on the part of some geographers toward geography tends to confuse educators who are not specialists in geography: by regarding school geography from the polytechnical rather than from the general educational point of view, they conclude that the role of geography in education is, generally speaking, quite small. Hence their attitude toward geography as a secondary subject that contributes little to educational objectives, which in turn results in a reduction of geography class hours in the curriculum and, consequently, in a reduction of the amount of material and the depth of geographic content of the courses.

We must therefore state clearly and unambiguously that geography is a subject having great importance chiefly in general education and in the Communist upbringing of students while playing a lesser role in polytechnical education.

It is possible that incorrect understanding of the real value of school geography is one of the reasons why middle-school geography education is now in such an unfavorable position in the Soviet Union.

The role of geography in the schools has in fact sharply declined since 1934, when the Soviet Government and the Communist party issued their historic decree on geography teaching (calling for greater emphasis on geography in Soviet education -- Editor, S.G.). This is evident, for example, in the number of hours assigned to geography in the new curriculum. While the decree of May 16, 1934, provided a total of 14 class hours a week for geography in the 5th through 9th grades, the new curriculum of the Ministry of Education RSFSR provides only 12 hours a week in all grades of the eight-year and middle schools. Moreover, while 5-1/2 hours were allocated to the 8th and 9th grades under the old system, the new middle school curriculum provides only 4 hours for the 10th and 11th grades; in

other words, the center of gravity of geography education has been shifted to the younger grades. In elementary school (4th grade) geography has been eliminated as a separate subject and has been combined with natural science in a new nature-study course. In the 5th, 6th, 7th, and 8th grades, geography has been allotted two hours a week each; there is no geography in the 9th grade, and two hours a week each are given to economic geography in the 10th and 11th grades. In short, instead of the present 468 hours, a total of 434 hours are given to geography from the 5th through the 11th grades; according to the decree of 1934, a total of 596 hours were allotted to the 5th through 9th grades (under the 1936 curriculum). Under the new curriculum of the 11-year school, geography is the only subject that has been reduced in the number of class hours compared with the previous 10-year school curriculum. The number of hours now allotted to geography in Soviet schools is now less than in the schools of all the other Socialist countries. (In all the Socialist countries of Europe, geography is taught at all educational levels, usually starting from the 3d grade, over a period of seven to nine years, with a total of up to 16 class hours a week (not counting elementary school). The share of the senior grades is usually 6 to 7 class hours a week. It should be noted that in recent school reforms in those countries, the number of hours allotted to geography was increased rather than reduced.)

But the point is not just the reduction in the number of class hours. In recent years the program of geography courses has been considerably "lightened" in content and in volume of material, which in turn has lowered the level of geography education; the study of maps has been greatly weakened by a sharp reduction of the use of geographical place names in the program; this in turn has made it difficult to realize a basic principle in geography education - "reliance on maps." Textbooks have also been "lightened" considerably, and some of them, such as I. I. Mamayev's 8th-grade text, have lost the positive qualities of previous texts, such as the one by I. A. Vitver (on economic geography of foreign countries - Editor, S.G.). For example, the historical-geographical section, which permitted a historical approach to the study of the present, has been eliminated from both the program and the textbook of economic geography; the same applies to the section on world economy and the Soviet Union's place in it.

Under the new curriculum, geography no longer requires final examinations, which, of course, reduces the students' responsibility for studying that discipline and appears to relegate it in the eyes of students to the rank of a "secondary" subject.

Consequently we are dealing here with evident underestimation of geography on the part of education agencies as a result of incorrect understanding of its value in the education and upbringing of youth. It should be clear to everyone that the value of geography in education and upbringing in the Soviet Union cannot be less than in other Socialist countries in view of the large size and population and the physical and economic diversity of the Soviet Union and, finally, its world importance.

This incorrect understanding of the role of geography in education is also evident in the new geography-study programs submitted for discussion by the teaching community. As under the present curriculum, geography teaching under the new curriculum begins in the 5th grade with a course on basic concepts of geography and on the earth as a whole. The course, however, does not finish in the 5th grade but continues into the first half of the 6th grade. This makes the total number of class hours in this course even greater than under the present program. Many problems of general physical geography are, as we know, too complex for 5th-grade students. The new draft program shifts some of the sections now studied in the 5th grade to the 6th grade. For example, the weather section remains in the 5th grade, but the climate section is shifted to the 6th grade; the section on landforms stays in the 5th grade, but the section on changes in landforms is transferred to the 6th. The subject "Natural zones and man" is also moved to the 6th grade. However, the degree of preparation of students in the first half of the 6th grade for understanding general concepts of physical geography differs from their preparation four to five months earlier in the second half of the 5th grade. In other words, the situation is the same: complex concepts, such as the nature of physical-geographic phenomena and processes cannot be assimilated by children in the 5th and 6th grades. In our view, the elementary geography course in the 5th grade should contain only the absolute minimum required for subsequent regional course on the continents. More complex concepts of physical geography, according to past experience, are best introduced gradually in the regional courses of the 6th through 8th grades. This is already being done in part: for example, the study of high and low pressure areas, the regime of streams, soils and other questions are being discussed in connection with the concrete description of various countries.

All the general concepts should then be made part of a single system in one of the senior classes before starting the study of economic geography. The best place for such a course is the 9th grade, which has no geography at all under the new curriculum. It should be noted that a course of general geography is taught in senior classes of nearly all countries. A strange situation exists in the Soviet Union: in the senior grades there is a special course of astronomy, dealing with the structure and development of heavenly bodies and the universe, and at the same time there is not even a small course on the physical laws of the earth as a whole.

The geographical community should urge on the appropriate authorities the need for introducing a course on general physical geography into the 9th grade.

The introduction of such a course in that grade would also be important for filling the gap in the annual continuity of geography courses in the eight-year and middle schools that exists under the new curriculum.

The geography courses are so arranged at the present time that physical geography is taught in the 5th through 7th grades and economic geography

in the 8th and 9th grades. It cannot be regarded as normal that present graduates of the seven-year school have an extremely scanty knowledge of the economic geography of the USSR and know nothing at all about the economic and political geography of foreign countries (the 6th-grade geography course merely teaches the location of the principal countries on the map). By no means all the graduates of the seven-year school continue their studies and, consequently, will not have had even an elementary course in economic geography, which they will need in life just as much as a course in physical geography. In that respect the new draft program makes a definite improvement by introducing elements of the economic geography of the USSR and foreign countries into the last year of the new eight-year school.

In examining the content of the geography curriculum of the eight-year school, a number of questions must be posed. According to the draft curriculum nearly all the countries of the world are included in the geography courses. Because of the small number of class hours in 6th and 7th grade geography, in most cases one hour is set aside for the study of each country. In one hour a teacher cannot discuss any country in sufficient detail and with enough depth and must devote most of his attention to the assimilation of place names. Such a kaleidoscope of countries with brief encyclopedic data about each country does not arouse interest in geography and does not have the educational value that geography should have. There is only one way out: only a few countries should be studied separately, including the largest countries, such as the United States, Britain, France, West and East Germany, neighbors of the Soviet Union, and some countries that are typical of certain groups of countries, such as Argentina or Brazil among the Latin-American countries, India and Indonesia among the newly independent countries, and so forth. Other countries should be discussed only in connection with study of the political map of continents.

For the 6th grade the new curriculum provides for study of the geography of the USSR in two weekly class hours. The curriculum properly introduces elements of the economic geography of the USSR into that course; that aspect should even be expanded. However, the number of class hours is unchanged from the present curriculum, which provides only for the study of physical geography. Instead of being reduced, the number of place names is even being increased through the addition of a large number of city names.

The geography courses are already very condensed and dry in content; the new curriculum further condenses the material and thus makes the courses even more dry and boring for the student. The new curriculum for the eight-year school sets aside two weekly class hours for the study of the geography of the USSR out of a total eight hours allotted to the 5th through 8th grades. That means 25 percent of the total class time is alloted to geography in the eight-year school instead of the present 30 percent or 36 percent of 1936. The reduction of time allotted to geography of the USSR is unjustified and inadmissible. It is true that most of the Socialist countries of Europe also set aside two weekly class hours for study of the home country. But there should be no need to point out the tremendous difference between the USSR

and any other country of Europe in size, population, geographical diversity and importance, especially for Soviet school children. Why should the citizens of the Soviet Union know their country in much less detail and depth than the citizens of all other countries? The course on geography of the USSR must be expanded in the eight-year school, by starting it in the 7th grade. The geography of continents would then be studied in the entire 6th grade and the first half of the 7th grade.

To be welcomed is the increase in class time provided by the new curriculum for study of the home oblast; the program could have gone even further in that respect. In most union republics of the Soviet Union the study of the home republic has already been introduced and special textbooks are being published. It seems to us that the time has come to publish separate textbooks and wall maps for all oblasts of the RSFSR and thus to enable students to study their home area. The Geographical Society of the USSR could assume responsibility for drafting a standardized outline for such oblast textbooks.

Another positive aspect of the new curriculum is the shift of the economic geography courses to the 10th and 11th grades, but we cannot agree with the reduction by one-third of the time allotted to the principal geography course completing the cycle of middle-school geography education, namely the economic geography of the USSR. At the present time that course, given in the 9th grade, is already very condensed despite its three class hours a week; in most cases only one class hour is devoted to each segment of the economy, which makes it impossible to discuss each sector in sufficient depth. Economic geography is the only course in which the economy of the Soviet Union is taught. Obviously it should also include some theoretical problems of concrete economics. Together with economic geography, students should also be made familiar with some concepts regarding the principal spheres of production and their technical and economic characteristics, without which they cannot be expected to understand the laws of development and location of the sectors of the economy. Many economic concepts, such as labor productivity, national economy, national income, gross and net output, and so forth, are not being taught in any middle-school course. Moreover the economic geography course should contain a section on the position of the USSR in the world and on the USSR as the leading country in the Socialist system.

An important objective of that course is also to acquaint students with statistical data.

The 11th grade course in economic geography of the USSR, like the course on the geography of the USSR given in the eight-year school, should include more detailed study of the home oblast (kray or republic). The reduction of time allotted to the 11th-grade course under the new curriculum results in the students' poorer knowledge of the economy of their country and thus harms their general education and the formation of their philosophy of life.

The geographical community cannot agree with the reduction in the number of geography hours in the senior grades and must urge on the appropriate authorities the question of including two weekly geography hours in the 9th grade, allowing study of general geography and more time for the programmed material of the course on the economic geography of the USSR.

Special mention should be made of the question of teaching geography in evening (work-shift or seasonal) schools for working and rural youths. That type of school is expected to become increasingly important. Its curriculum will differ substantially from that of the general educational, polytechnical working middle school (11-year school) with industrial training. The fact that students among working and rural youths have had a certain amount of experience in life and labor, and that the specific character of the teaching program and the teaching time require special considerations with regard to the curriculum, the selection of teaching material and the system and methods of teaching in that type of school.

Until now geography was taught in the schools for working and rural youths according to the same system and the same textbooks as in ordinary schools despite the fact that the students in the evening schools usually differ considerably in age and life experience from those in the corresponding classes of the day schools. It would seem obvious that the teaching system and methods of the day schools cannot be mechanically applied to the evening schools.

In our view the attention of the Ministry of Education and of the Academy of Pedagogic Sciences should be drawn to the importance of working out special curricula, textbooks and teaching methods for the evening schools. Moreover in the evening schools, as in the 11-year day schools, there should be final geography examinations after the 8th and 11th grades. Teachers feel quite properly that a subject without examination is "respected by no one, neither student nor teacher." The holding of an examination would greatly raise the value of the geography course and help students better to assimilate geography knowledge.

The teaching of geography will also involve distinctive features in the boarding schools, where it will be much easier to work out a more thorough system of education and upbringing, based in particular on the geography courses. The Academy of Pedagogic Sciences should be urged to compile special teaching handbooks for geography teachers in boarding schools.

Attention must be drawn to the fact that geography courses are entirely missing or represented to a very small degree in the curricula of vocational schools (tekhnikums and trade schools). The objective of preparing "for all branches of the economy cultured and technically educated skilled workers and farmers, the Communist upbringing of students, their ideological hardening, and the instilling in students of a Communist attitude toward labor" (Law on Strengthening Ties Between School and Life) requires, it seems to us, the inclusion of a geography education in all educational in-

stitutions at an adequately high level. The appropriate authorities should therefore be urged to introduce a geography course into the curriculum of all vocational schools, with special syllabuses corresponding to the character of those schools.

One methodological question should be mentioned in this survey of the teaching of geography in Soviet schools. In recent years geography teaching has paid increasing attention to practical exercises in the field, field observations and classroom experiments while neglecting work with maps, pictures and other illustrations. Films are being used quite insufficiently. The fact is that most of the geography objects studied in regional courses cannot be observed in the field. Therefore maps, pictures, models, photographs and other visual aids remain the basic sources for conveying certain concepts to students. There should be greater emphasis on such visual aids in class, and students should be encouraged to take an active part in map reading, for example, by writing regional descriptions from the map, talking about what the map shows, as well as in the demonstration of other visual aids, such as pictures and films. The geography film libraries should be expanded and teachers should be encouraged to design additional teaching aids, such as instruments and models, as well as to organize a geography study area in the schoolyard and a geography study room in the school.

Oral presentation of the subject matter should not be cancelled out, as sometimes happens, by field observations or practical exercises in the field. Oral explanations by the teacher play an important role in geography teaching.

In conclusion, it must be pointed out that better geography teaching also depends on further improvement of geography-teacher training, raising the qualifications of working teachers, on contacts between teachers and research geographers and on the role of teachers colleges and universities in preparing new teachers. However, the problems of teachers colleges are being discussed in a special paper at this congress (see Soviet Geography, November 1961) and the other problems have been discussed in Geografiya v shkole, 1959, No. 6, in the article titled "Geography teachers and geographic science on the eve of the First Russian Teachers Congress." These papers provide sufficient material for discussion of these problems.

REVIEW AND DISCUSSION OF V. A. ANUCHIN'S BOOK ON THEORY OF GEOGRAPHY

(Abstract: Following are a review and a discussion of V. A. Anuchin's controversial book Teoreticheskiye problemy geografii (Theoretical Problems of Geography), Moscow: Geographical Publishing House, 1960, 264 pp. The table of contents of this book was translated in Soviet Geography, March 1961, p. 88.)

A METHODOLOGICAL JUMBLE IN THEORETICAL PROBLEMS OF GEOGRAPHY

By O. A. Konstantinov

(From Izvestiya Akademii Nauk SSSR, seriya geograficheskaya, 1961, No. 4, pp. 146-49)

As is generally known, the treatment of geography as a unified science has been rejected in the Soviet Union. It has long been shown that so-called "unified geography," no matter in what form, leads, regardless of the subjective intentions of its proponents, to geographical determinism and an application of the laws of nature to social phenomena.

Soviet geographers hold at the present time that geography represents a system or complex of sciences. For example, Academician A. A. Grigor'yev has said: "Geography is a complex of closely related sciences covering physical and economic geography" (Kratkaya geograficheskaya entsiklopediya, Vol. I, 1960, p. 423). According to Academician I. P. Gerasimov, "... the system of geographic sciences falls in the first place into two major divisions: physical geography and economic geography, which includes the geography of population" (Sovetskaya geografiya, Geografgiz, 1960, p. 7). Professor S. V. Kalesnik, corresponding member of the Academy of Sciences USSR, has devoted a special article to the system of contemporary geographic sciences (Nauchnyye doklady vysshey shkoly. Geologo-geograficheskiye nauki, 1959, No. 1).

It would seem that we had settled the question of a "unified geography" and that no new arguments in its favor could be raised. That is why one starts reading V. A. Anuchin's book with great interest since he writes in his foreword of a desire to justify the "monistic" view of geography as an integral, unified science. One is inclined to conclude from that statement that the book contains new ideas, new concepts, in general some new words that would promote the progress of science.

However the first chapters of the book already produce puzzlement, which upon completion of the book turns into bitter disappointment. Once we remove the wrapping of words, there is nothing new on the substance of the topic treated in the book; instead we find "methods" that have never and nowhere found support in science.

The first half of the book is devoted entirely to a history of ideas in the field of geography. But there is no objective exposition of that history.

For example, here is how the book treats the views of Henry Buckle. First the following excerpt is cited: "If we inquire what those physical agents are by which the human race is most powerfully influenced, we shall find that they may be classed under four heads: namely, Climate, Food, Soil and the General Aspect of Nature" (Henry Buckle, History of Civilization in England, Russian edition, Vol. I, St. Petersburg, 1895, p. 16). From this Anuchin draws the following conclusion: "As we see, he expressed a very true thought about the influence of the geographical environment on the development of society through the intermediary of production..." (p. 44). Nothing of the sort is evident from the quotation cited, and such a true thought could never have been expressed by Buckle, who was one of the leading representatives of geographical determinism. The statements of other authors are treated in similar "free" fashion in this book.

Here is the way anthropogeography is assessed: "The work of the anthropogeographers completed a period in which work based on geographical determinism still retained its scientific character. Subsequent development of the concepts of geographical determinism led to patently anti-scientific conclusions" (p. 71). Here we should recall what was written, for example, by A. A. Kruber: "Like all other living things on earth, man is subordinated to the laws of nature that determine with irresistible unavoidability both the conditions of human settlement and the characteristics of man's way of life" Obshcheye zemlevedeniye (General Earth Science, Vol. III, Book 3: Anthropogeography, Moscow, 1922, p. 191). Thus, making black appear white, Anuchin tries to prove the scientific character of anthropogeography. In his view, the scientific value of the work of determinist geographers was quite substantial in general (p. 153).

The historical treatment pursues an additional aim: it is to show that geography is unified. Here are some of the arguments that Anuchin employs for that purpose: "The history of geography clearly demonstrates its unity. Physical and economic geography have long developed as one common science. They have a common history and pre-history" (pp. 160-61). No, that is wrong, it was not just that common history! Since Anuchin is on the Geography Faculty of Moscow University, it may be appropriate here to mention another book written at that institution. It is Otechestvennyye ekonomiko-geografy (Russian Economic Geographers), Uchpedgiz, 1957. It is evident from that book that the sources of contemporary economic geography are to be found not only in the literature of general geography, but in statistics, ethnography and other branches of knowledge.

Thus Anuchin tries to give a historical "justification" of a unified geography by stressing one aspect and consciously passing in silence over another aspect.

Anuchin treats the views of contemporary authors in the same way as

authors of the past. On p. 111 he lists the names of Soviet geographers who have taken the position of "monism," i.e. unified geography. In such cases it is customary to make exact references to published works where the authors named came out in favor of unified geography. But Anuchin rejects such generally accepted methods of scientific exposition because if he were to use such methods, he would not obtain the desired results.

Let us take as an example Yu. G. Saushkin, whom Anuchin lists among the "monists." "When we speak of 'geography' we have in mind in the first place the creative collaboration of two geographic sciences: physical geography and economic geography" (Yu. G. Saushkin, Vvedeniye v ekonomicheskuyu geografiyu (Introduction to Economic Geography), p. 11.) As we can see, he talks about two geographic sciences and not a unified geography. If we were to use Anuchin's terminology, Saushkin would take the position of "dualism"rather than "monism." Whether one agrees or does not agree with certain statements in Saushkin's book, one thing is clear: nowhere in the book does he come out in favor of a unified geography. Another thing is clear: since the publication of his book in 1957 he has nowhere in print repudiated his "dualistic" position or come out in favor of "monism."

Now that we have taken cognizance of the way in which Anuchin treats the history of geographic science, let us see how he justifies its unity. That justification is very simple.

All geographic sciences, he asserts, have one common object of study and one common method of studying that object. The object is the landscape envelope of the earth, which, according to Anuchin, virtually coincides with the geographical environment. Physical geography studies combinations of natural elements, and economic geography "combinations of social elements of the earth's landscape envelope, expressed mainly in the form of territorial production complexes" (p. 114). By social elements of the earth's landscape envelope, Anuchin means only productive forces: "...economic geography does not study productive relationships, but productive forces in their territorial expression and in combination with objects of labor" (p. 194).

It is well known that no territorial production complexes exist outside of the geographical division of labor. N. N. Baranskiy once wrote (referring to Lenin) that the process of geographical division of labor is identical with the process of formation and differentiation of economic regions (Ekonomicheskaya geografiya. Ekonomicheskaya kartografiya, p. 69). "The geographical division of labor is the basic concept of economic geography" (same, p. 80). "By geographical division of labor we mean a spatial form of the social division of labor" (same, p. 55).

There is no need to explain that the social division of labor (including its spatial form) is a concept relating to productive relationships. But Anuchin asserts categorically that economic geography does not study productive relationships (p. 194). Consequently it does not study the geo-

graphical division of labor. The question arises: what science does study the geographical division of labor, how does the author expect to study territorial production complexes outside of the geographical division of labor and, in view of such a fundamental difference with Baranskiy, how can Anuchin include Baranskiy among people holding the same views as he (p. 111)?

What then is the essence of the "new words" enunciated by Anuchin?

About 35 years ago economic geography was treated in the Soviet Union (though not by all) as a science dealing with the location of productive forces. Anuchin throws us back to that time since we now regard economic geography as a science dealing with the location of production, which is understood as the unity of productive forces and productive relationships. However, according to Anuchin, "...production relationships... under a given mode of production...show no substantial differences of a territorial character because the common mode of production tends to level such differences" (p. 188).

In other words, differences between countries of the capitalist world or differences within the economy of a capitalist country do not depend on the level, the nature and the characteristics of the development of capitalism?

On what do differences in productive forces depend? Anuchin replies thus: "...the mode of production does not eliminate the substance of differences in productive forces because the effect of the natural laws in them can differ substantially in various countries and regions, which in turn produces various kinds of interaction between society and nature for a given mode of production" (p. 189; Anuchin's italics).

Thus, according to Anuchin, territorial differences in productive forces and in the interrelations between nature and society depend exclusively on the effect of natural laws.

The "novelty" of this point of view is ages old. But that is not enough for Anuchin. In his opinion, there are links "between society and the rest of nature" (p. 71), interactions between the population and "the rest of nature" (p. 115), "interactions between society and the rest of nature" (p. 120), i.e. human society is part of nature. That means returning to even more remote times, to the times of the most primitive geographical materialism.

From this "new" point of view Anuchin attempts to justify the unity of geography: "By combining all sciences that are concerned with elements of the geographical environment, geography constitutes at the same time a system of those sciences, and a synthetic, integral science dealing with the geographical environment as a whole" (p. 160). How can geography be at the same time a system of sciences and an integral science, how can it be at the same time plural and singular? The author tries to get out of

that contradiction as follows: he states that the system of geographic sciences forms a single, integral science, namely geography. That synthetic science has its particular object of study -- the landscape envelope of the earth as a whole as well as its territorial complexes (p. 134).

We know that economic geography deals with territorial production complexes, and physical geography with natural complexes. But with what territorial complexes does synthetic geography deal? That question would not arise if natural and economic complexes had identical boundaries. But how and on the basis of what criteria are we to delimit territorial complexes that are the object of study of synthetic geography? The book provides no answer. Such complexes are simply declared to exist, just as the author uses the declarative method to "justify" the unity of geography. In general that seems to be the style of the book: the author writes, for example: "The geography of agriculture and several sections of the geography of population can be regarded as 'transitional' between biological and economic geography" (p. 138). What these sections are and why they are transitional is not explained. Such a method of exposition deprives the book of its scientific character.

The author's unceremonious attitude toward facts for the sake of arriving at desired conclusions also makes the book worthless from a scientific point of view. Thus, Anuchin affirms that, from the point of view of economic geography, factors of a political order are not region-forming (p. 173). Wherever did Anuchin find that kind of economic geography in the Soviet Union? It is well known that the presence of proletarian centers, the ethnic composition of the population, the boundaries of union republics and autonomous republics, and similar political factors are of tremendous region-forming significance. But to recognize those facts requires acknowledgment that one cannot make a single step in economic geography not only without production relationships but without many superstructural factors. And if that is acknowledged, then economic geography cannot be part of a science dealing with the landscape envelope of the earth, and consequently there cannot be a unified geography. But since Anuchin decided to prove at all costs that a unified geography exists, he proceeds without foundation to deny reality and asserts that factors of a political character are not region-forming in economic geography.

Many more critical observations could be made with regard to this unsuccessful book, but everything is clear anyway. We have here a new attempt to resurrect "unified geography" and the unavoidably related geographical determinism. Anuchin's views could be stated literally on a few pages. But to make them more convincing, the author had recourse to wide historical digressions, mobilized a vast number of quotations from the works of Marx, Engels, Plekhanov, Lenin, Stalin and Khrushchev, and examined all kinds of philosophical categories (including some unrelated to the subject). At the same time, the book contains a critique of geographical determinism and of unified geography. As a result Anuchin's book contains a great deal of truth; an experienced polemicist could counter many arguments of opponents

with abundant references to very good and entirely correct parts of Anuchin's book. But this cannot in any way divert from the inconsistency of the concept as a whole.

On p. 108 Anuchin quotes sympathetically a long excerpt from the well-known book American Geography: Inventory and Prospect, which begins: "Almost all scholars who have thought deeply about the nature of geography agree on the essential unity of the field." And the excerpt ends: "Actually there is just one kind of geography."

Now we know to whom Anuchin appeals and with whom he has something in common! But even the most convinced adherents of a unified geography, no matter where, will be forced to concede that Anuchin in an effort to prove his ideas has recourse to methods that are not permitted anywhere in scientific writing.

Anuchin's book produces a negative reaction because it is unscientific. The author rejected generally accepted methods of scientific exposition and objective analysis, substituting instead a free use of names, ideas and facts for the sake of arriving at a previously set objective. The rejection of objectivity and a scientific approach inevitably led to gross distortions of elementary principles of Marxism-Leninism.

The lack of success of Anuchin's book does not mean in any way that any attempt to find points of contact between physical and and economic geography would be condemned out of hand. Since physical and economic geography are both part of one system of sciences, we should welcome studies that analyze objectively, on a genuine scientific basis and without preconceptions the factors that unite the two geographies in a single system.

Although this problem could be solved in a purely abstract, philosophical manner, it should be said that this is not the only way. Another possibility is the theoretical interpretation of practice. To return to the case at hand, Anuchin, for example, has many years' experience in the field, he has long taken part in integrated geographic field work, and has written studies of a general geographic (regional) character. Why did he not generalize both his own practical experience and that of other geographers, why did he not show in concrete examples how physical and economic geographers work together in integrated geographic field parties, and how, in the process of that cooperation, they discovered those common objects of study and used those common methodological approaches about which he writes abstractly in his book? The book does not contain a single example, not a single fact out of geographical reality. One might think that the author is not a practicing geographer, but a philosopher remote from live geographic work. Why not show the actual circumstances giving rise to those territorial complexes which, according to Anuchin, are the object of study of a unified, synthetic geography? An analysis of such complexes would do a great deal more to prove the methodological community of physical and economic geography than all the jumbled theorizing.

Theoretical interpretation of practice is a tested road of scientific development. It is to be regretted that Anuchin did not use that road.

REPORT ON DISCUSSION OF ANUCHIN'S BOOK

(From Izvestiya Vsesoyuznogo Geograficheskogo Obshchestva, 1961, No. 4, pp. 362-70)

Anuchin's book was discussed April 10, 1961, at a combined meeting of the Division of Physical Geography and the Division of Economic Geography of the Geographical Society USSR in Leningrad. Present at the meeting were the author and two docents of Moscow University, D. I. Koshelevskiy of the Philosophy Department and A. T. Khrushchev of the Department of Economic Geography of the USSR. The chairman of the meeting was S. V. Obruchev, member of the Society's Presidium and chairman of the Division of Physical Geography. (The following summaries of the comments of the discussants were submitted by the discussants themselves.)

V. A. Anuchin (introductory comments). A proverb says, "If you are afraid of wolves, don't go into the forest." In geography, our attitude toward theoretical studies is often like that toward wolves, and therefore geographers probably prefer not to go into the "theoretical forest." In fact, as soon as someone tries to say something new on the subject, he is deluged with attacks and "labels" are pinned on him. Is it any wonder that questions of theory have been inadequately worked out in geography?

Why did I become so bold as to work on questions of theory? Because, having worked as a practicing geographer, especially in regional studies, I saw that from a theoretical point of view the actual right of existence of such a science as geography had long been placed in doubt. I had occasion to fight critics of my book Geograficheskiye ocherki Man'chzhurii (Geographical Essays on Manchuria; 1948) who criticized it not for any shortcomings but tried to show the impossibility of putting out general geographical studies. "They can be economic-geographical or physical-geographical essays," they said, "but if you write geographical essays then you inevitably confuse natural laws with social laws and you arrive at a unified geography, i.e. you lean toward geographical determinism, toward geopolitics..." In other words, a geographer who wanted to work in geography, was equated with a geopolitician.

Let's be logical: if we maintained that geography did not exist, and there were only individual geographic sciences, completely unrelated to each other and united only through their origins, then by what right would there be geography faculties and a Geographical Society? By no right whatsoever! They would merely be survivals inherited from the time when geo-

graphy was a united, undivided science. Such institutions would be "museums," obvious manifestations of anachronism.

Does that correspond to reality? I assume not. All geographic sciences represent a unity because of the common character of their study object and methods. It is to a theoretical proof and, if you wish, a philosophical proof of that unity that the book under discussion here today is dedicated.

It seems to me that a differentiation of geography is a legitimate form of development. Differentiation is a process that will inevitably continue to manifest itself. I have no doubt that quite a number of new geographic sciences will arise in the future. But we have an incorrect tendency of regarding this process of differentiation in geography as a process of liquidation, a process of disintegration of geography. It is sometimes said that geography no longer has its distinctive object of study and that the time has come to include geomorphology in geology, climatology in physics, and the geography of soils, vegetation and animal life in biology. As far as economic geography is concerned, many economic geographers have long included it in the economic sciences.

It seems to me that in order to refute these statements we must solve the problem of the general and the particular insofar as it applies to geography. No matter how we try to study the general by identifying and studying the elements (particulars) that make up the general, we still need a science studying the general as a whole. The sum of knowledge of individual elements of a given whole never provides knowledge about the whole. Therefore, no matter how deeply the differentiation of geography might proceed, there would always be a need for geography as a whole, a need for studying the earth's landscape envelope as a whole and in its territorial complexes.

I will not discuss the content of the book. Let me only repeat that its aim is the creation of a theoretical concept of geographic science.

S. V. Kalesnik. The content of Anuchin's book is not unexpected for geographers since the author in the last five years has come out several times with articles stating his views. However, that did not reduce the interest in his book since the reader had the right to expect that the author's views would be expounded more deeply and with more documentation than in magazine articles. Unfortunately that expectation was unfounded. Anuchin's book contains many external and internal shortcomings.

The external shortcomings include: (1) burdening the book with historical chapters that take up half of the entire volume and are superfluous since they discuss things that are well known to every educated geographer; (2) an immoderate amount of quotations from the classics of Marxism, which are, of course, interesting but have no direct bearing on Anuchin's book; in those jungles of quotations it is hard to follow the author's own trend of thought; (3) with its polemic edge, Anuchin's book appears to be directed against some faceless and nameless opponent; supporters of Anuchin's ideas are

named (incidentally, that list is entirely the responsibility of the author), and geographers who hold other views are not identified, except for I. M. Zabelin, who, for some reason, is selected as the only one responsible for all the sins of the "dualists"; (4) the author unfortunately revives the practice of "pinning labels" on opponents in proclaiming right in his Introduction that his concept is the only materialistic one (and, consequently that other concepts are idealistic) and picturing differently minded persons (on p. 112) as some kind of simpletons, freely ascribing to them many ridiculous ideas, such as denial of the possibility of geographical synthesis, disappearance of the object of study of the science as a result of its differentiation, and so forth. Having thus "defeated" from the very start any potential opponents, Anuchin only then begins to state his views and to criticize opinions that do not agree with those views.

Of course, in creating his "monistic" theory of geography, Anuchin pursued positive objectives: he proclaimed a struggle against the denial of the existence of the system of geographic sciences, against a complete break between physical and economic geography, against raising artificial barriers between the geographic sciences (p. 115). But his great mistake is that he sees in all this the need for an ideological struggle, while all that is actually necessary are organizational measures. None of the Soviet geographers denies the existence of a system of geographic sciences; at all our geographic congresses and meetings we have stressed the need for close collaboration among geographers of all specialities, especially physical and economic geographers; the field parties of the geography faculties of Leningrad, Moscow, L'vov, Latvian and other universities have for several years already practiced joint, integrated work in physical and economic geography. That kind of collaboration is still inadequate (because of inertia, an inability to get things going, and so forth) and it should be further expanded, but for that reason there is no need to write books calling three quarters (if not more) of Soviet geographers idealists ("dualists").

The methods of argumentation used by Anuchin to prove the correctness of his views on the substance are also extremely unconvincing. He tries to prove the unity of geography in two ways. The first way is to simply rename the system of geographic sciences an "integral geographic science" (p. 145). By this simple procedure, any combination of sciences could evidently be transformed into a unified science. This way is supported by another approach: the assertion that all disciplines forming part of the system of geographic sciences allegedly deal with a common object of study. That common object is the earth's landscape envelope (p. 115). Later the author corrects himself: he means not the entire landscape envelope but that part which is the geographical environment. But if the geographical environment is only part of the landscape envelope, then the latter contains a certain fraction that cannot be regarded as an object of study common to all (natural and humanist) geographic sciences. How to get out of that impasse? Very simple: knowing full well that the landscape envelope and the geographical environment are different things that do not always coincide in space, the author arbitrarily equates them and writes with touching frankness and naïveté:

"We are doing that because only the geographical environment is a common object for both natural and social sciences, which are thus combined into a certain unity" (p. 117). In other words, the author says quite frankly: I must have a common object of study for both natural and social geographic sciences, and therefore I arbitrarily regard different things as one thing. Does not the author know that by using such a method he gets not a unified science but an "arbitrarily unified" science, i.e. in substance he achieves absolutely nothing except to create illusions that no one needs?

In order to justify more firmly the common character of the object of physical and economic geography, Anuchin includes man (human society) among the components of the landscape envelope. On that occasion he thinks up a new series of sins of the "dualists": they supposedly oppose human society and nature; they forget that man is part of nature; they uproot man from nature. All this is of course nonsense: the notorious "dualists" (in other words, all Soviet geographers who do not share Anuchin's views) do not talk of "uprooting" man from nature, but of separating social laws from natural laws, and they assert that nature and society develop at different rates and on the basis of different specific laws. Those more general laws that apply equally to nature and to society have long been formulated in historical and dialectical materialism, and a geographer does not have to deal with them directly. He should deal with the specific laws of his objects of study.

Anuchin confuses the more general laws of nature and society with the general, but still more particular, geographic laws. If we were to develop logically his thesis about the existence in the geographical environment (in which he includes human society) of laws that apply equally to all the components of that environment (p. 143), then it is easy to conclude, for example, that earthquakes may affect the changeover from a slave-owning to a feudal society. Naturally, Anuchin does not draw such silly conclusions, but he opens the theoretical possibility of arriving at such conclusions.

Anuchin is wrong when he says that "geographic sciences can be called sciences dealing with territorial complexes" (p. 202). Most of the geographic sciences are characterized in the first place by their typological approach to objects of study regardless of their spatial combinations. There is no way of learning from Anuchin's book what regional geography is. In one place he says that regional geography is not geography (p. 207); elsewhere he asserts that "regional geography does not differ in principle from geography" (p. 209). Then the statement is made that regional geography is not an independent science (p. 207) (and that is true!). But once it is said that regional geography does not differ in principle from geography, then the conclusion may be drawn that geography is also not an independent science (and that is wrong!).

Such is the style of Anuchin's reasoning and argumentation: a multitude of qualifications, strained interpretations, internal inconsistencies and contradictions. All this, taken together, does not in any way render more convincing what the author is trying to prove.

Anuchin's book contains particular statements and interesting ideas that deserve attention. But they do not make up for the lack of proof of his basic theses. Anuchin created his concept artificially, without there being any theoretical or practical need for it. The division of Soviet geographers into monists and dualists is an invention. In general there is absolutely no ground for such a division, which would be expected to emphasize ideological differences. Nor does Anuchin's concept shine by its novelty since other Soviet geographers have also come out in favor of a unified geography, and that idea is even dominant abroad. In calling for the writing of general geographic studies and in assuming that such studies are possible only after geography has been acknowledged to have a common object of study, the author simply confuses the process of study of a certain object (which requires specialized science) with the process of synthesis of the results of several independent studies (which does not require a specialized science, but simply a combining of data from various disciplines).

Of course, Anuchin's book will cause geographers once again to think about and check their theoretical positions. However, that is the extent of its positive value.

O. A. Konstantinov. Since the middle 1920's we have waged a struggle against so-called unified geography. Although the criticism was not always sufficiently skilled and allowed errors of a voluntarist nature, it was correct on the whole. That criticism enables Soviet geography to reorganize itself on the basis of dialectical and historical materialism. Only the rejection of the unified-geography concept helped Soviet geographers to adopt Marxist-Leninist positions.

Now all Soviet geographers (or in any case their overwhelming majority) treat geography as a system or complex of sciences (see, for example, A. A. Grigor'yev, Kratk. geogr. entsikl., Vol. I, p. 423; I. P. Gerasimov, Sovetskaya geografiya. Geografgiz, p. 7; S. V. Kalesnik, Nauchnyye doklady vysshey shkoly. Geologo-geogr. nauki, 1959, No. 1; Yu. G. Saushkin, Vvedeniye v ekonomicheskuyu geografiyu. Moscow University, 1958, pp. 11, 25, 26 and others). That system includes in the first place physical and economic geography, of which one is a natural science and the other a social science. There has long been creative collaboration between the two. There have also been many attempts to justify the common aspects that bring the two sciences closer to each other and those aspects that combine them into a system of sciences.

Anuchin is not satisfied with the "dualism" that exists in Soviet geography and tried to justify a "monistic," i.e. unified geography. On p. 111 he lists many geographers (Editor's note, S.G.: N. N. Baranskiy, N. N. Kolosovskiy, V. N. Sementovskiy, I. A. Vitver, Yu. G. Saushkin, A. M. Ryabchikov, A. I. Solov'yev, V. T. Zaychikov, S. N. Ryazantsev and Yu. K. Yefremov), whom he declares to be "monists." If "monism" does exist among Soviet geographers and is being supported by a large number of them, then why write a whole book to justify that point of view? If, on the

other hand, Anuchin's views do not concord with those of other "monists," why not say that his understanding of geography differs from those whom he includes among the "monists"?

To prove the unity of geography and the great scientific value of geographical determinism, the author devotes half of his book to a history of development of geographical ideas. He treats that history in a rather arbitrary fashion.

According to Anuchin, geography as a single science has a common object of study and a common method of studying that object. That common object is the earth's landscape envelope, which, according to Anuchin, supposedly coincides with the geographical environment. The geographical environment, in Anuchin's view, includes a complex of elements from the social group, among which the author includes only productive forces and excludes productive relationships and all superstructural elements. "Geography, and especially economic geography, does not study productive relationships, but productive forces in their territorial expression and in combination with objects of labor" (p. 194). Anuchin thus throws us 30 years back, when economic geography was treated (and then not by all) as a science dealing with the location of productive forces. We know that Marxism-Leninism regards productive forces and productive relationships as two aspects of production. Anuchin wants to break that unity. He rejects as wrong (pp. 197-98) a definition of economic geography based on that unity and adopted by the Second Congress of the Geographical Society (including, incidentally, those whom Anuchin calls "monists").

How can we explain the formation of territorial production complexes and territorial differences in productive forces without drawing on productive relationships and various superstructural elements? This is possible, according to Anuchin, because under a given mode of production the productive relationships show no substantial differences of a territorial character, and differences in the interactions between nature and society are determined not by the mode of production but by the action of natural laws (p. 188-89). Anuchin thus departs from elementary Marxist principles.

If physical geography studies the laws of nature, and economic geography studies phenomena formed under the influence of social laws (p. 114), then what laws are studied by synthetic, unified geography? On p. 120 Anuchin writes straight out that geographers do not study laws of social development but do study the interaction between human society and the rest of nature as a manifestation of the internal laws of the geographical environment. In other words, human society is part of nature and its interaction with the rest of nature is determined by natural laws. These views of Anuchin take us back to the ancient concepts of geographical determinism that have long been rejected by science.

Anuchin sharply opposes the classification of economic geography as an economic science, although he repeatedly asserts that it is a social science. But there are many social sciences: we have historical sciences, legal sci-

ences, economic sciences, literary sciences, linguistic sciences, and many others. To which does economic geography belong? Of course, to the economic sciences. This point of view is widespread. For example, Yu. G. Saushkin wrote: "Economic geography belongs not only to the geographic but to the economic sciences ... economic geography could not make one step ... without economic theory" (Vvedeniye..., p. 31). Incidentally, the existence of such a fundamental difference with Saushkin (together with some other differences) does not prevent Anuchin from considering Saushkin a like-minded geographer. Anuchin ignores the fact that each of the geographic sciences (except physical geography) belongs at the same time to those sciences whose laws are studied by the given geographic science. Botanical geography, zoogeography and soil geography belong at the same time to the biological sciences, geomorphology to the geological sciences, cartography to the technical sciences, climatology and hydrology to the physical sciences.

Let's sum up. We have here a new attempt to prove that geography is a unified science. That concept of "monism" has led inevitably to a revival of geographical determinism. The author does not offer any new proof that is scientifically convincing. His proof consists of all kinds of theoretical computations and philosophical argumentations. The book does not contain a single example out of live geographical reality. In his foreword the author refers to his experience in integrated geographic studies, but that experience is not reflected in the book.

Anuchin's book must be considered harmful. The wide historical digressions, the abundance of quotations, the many references to the classics of Marxism-Leninism, to the classics of philosophy and the classics of geography, the mentioning of many Soviet authors, the extensive bibliography, and, what is most important, the critique of a unified geography and of geographical determinism, and the repeated assertions of the author that he follows consistently the point of view of dialectical materialism -- all this is designed to inspire trust toward the author and to convince the reader that the author is right. At the same time there is a lot of truth in Anuchin's book. An experienced polemicist could rebut many arguments directed against Anuchin's ideas by references to the many correct passages in his work. But that is precisely why the book is especially dangerous.

Experienced people will easily detect the unscientific character of the book and its break with Marxism-Leninism despite the abundance of quotations and abstract argumentation. But readers who are not very experienced in theoretical disputes or have no firm theoretical views of their own may take the book seriously. Public condemnation of Anuchin's book would help to unmask it as unscientific and anti-Marxist.

D. I. Koshelevskiy. The publication of Anuchin's book is a major event not only on the theoretical front of geography but on the philosophical front. The work has attracted the attention of philosophers interested in problems of natural science and historical materialism.

We know that the philosophical problems of geographic science have remained virtually untouched in the Soviet Union until recently. The discussion that was started in the journal Voprosy filosofii did not yield any important results. At national conferences on philosophical problems in natural science there has not been a single paper on the subject. In that respect geographers have been lagging behind the physicists, biologists, mathematicians and others. There is no need to prove that such a situation has not helped the geographic sciences.

Anuchin in his book has for the first time examined these questions. He has, in particular, investigated deeply the course of development of geographical ideas in connection with the development of philosophy and the requirements of social-historical practice. That is one of the principal merits of the book. That part of Anuchin's work will help, in particular, to create a course in the history of geography.

Another question of considerable interest that is discussed in Anuchin's book is the relationship between nature and society. That is an important philosophical and sociological problem. At the same time it is an important methodological problem in geographic science. Without a materialistic solution of the problem we cannot even think of solving major theoretical and practical problems in geographic science, such as the subject and method of geographic science, the place of geography in the system of sciences, and its relations with practical activities. As long as we had no Marxist solution of that problem, determinism or indeterminism reigned in geographic science. All geographers who sought to find a correct solution did not get beyond the limits of idealism. Even the most consistent materialistic geographers were materialists only as long as they were not concerned with the problem of nature and society, and as soon as they were concerned with it, they stopped being materialists.

Anuchin's book defends and justifies its principal idea -- the idea of the unity of geography. He shows very convincingly that as long as geography was a descriptive science it could be unified, but when it began to study the substance of geographic processes, starting in the middle of the 19th century, unified geography fell into two parts -- physical and economic geography, and this was legitimate since the substance of physical geography and natural processes differs in principle from social laws.

However, contemporary geography based on a Marxist methodology and on a materialistic understanding of history can and should be unified. Anuchin's book states the justification of the unity of geography as a concrete expression of the great philosophical problem of nature and society.

How does Anuchin justify the unity of geography?

One can speak of the unity of a science when it has a unified object of study. Anuchin shows that there is but one subject of geography. At the same time that subject is very complex because it is made up of elements

of different qualities. They include natural phenomena, subjected to the laws of nature, and social phenomena, subjected to the laws of social development. But these elements of different qualities form a certain whole, a certain unity.

What determines, what creates that unity? The unifying basis is the fact that all these elements of different qualities form the geographical basis of social life, i.e. the geographical environment. The geographical environment is unified in its function. That function is to be the geographical basis of social production. But it is unified not only in its function: Anuchin asserts that it is also unified in substance.

The geographical environment is an arena of constant interaction between social and natural laws, with social laws playing the leading role in that interaction. "Human society," Anuchin writes, "is the leading part of the dialectical unity that it makes up jointly with nature" (p. 97). Asserting that the geographical environment is a general object of study for all branches of geography, Anuchin shows that all geographical sciences have a common, unified geographical method, the substance of which is that all geographical sciences study objects in terms of their territorial complexes. Anuchin says that the aggregate of features determined by the specific application of dialectics to the subject of geography constitutes the geographic method. The book thus shows that the specific character of the subject of geography determines the specific character of its method. The methodological and subject unity of geographic science is convincingly demonstrated.

A consistent theoretical justification of the unity of geography is of tremendous practical importance. The author's theoretical conclusions are directed against a nihilistic attitude toward the geographical environment and against an underestimation of the environment that has brought harm to the national economy. The party is known to have repeatedly drawn attention to that aspect of the question. Only recently N. S. Khrushchev spoke about it at the January, 1961, plenary meeting of the party's Central Committee. Nearly all questions related to the creation of a material and technical basis of communism involve careful consideration of the specific geographical conditions. Geographic science can handle the demands made upon it by the practical needs of Communist construction if it is based on a correct theoretical foundation. It seems to be that this theoretical foundation of contemporary geography and the main lines of further development are stated in Anuchin's book. Written on the basis of Marxist methodology, it represents an undoubted contribution to the development of geographic science.

Very favorable objective conditions now exist in the Soviet Union for the development of geography. Practical requirements call increasingly for study of territorial complexes of the geographical environment rather than its individual components, as in the past. But the erroneous concept of geography as some kind of collection of unrelated sciences has until now prevented geography from engaging in broad geographic research. These

subjective factors, called in Anuchin's book the "theory of dismembered geography," are opposed to the objective requirements of life and interfere with the development of the practice of general geographic research.

B. N. Semevskiy. Anuchin has done a great deal of work in attempting to examine the philosophical bases of geography and its theoretical foundation. He has relied on the inheritance of the past and has made wide use of the concepts of philosophers and geographers -- from the classics of ancient Greece to Hettner and V. P. Semenov-Tyan-Shanskiy; he has used the work of contemporary American geographers and the views of some of the geographers of Moscow University. Although he has approached the question on a very broad plane, Anuchin did not go beyond the framework of views that exist among some of the Moscow University geographers. It is no accident that in listing Soviet geographers "whose monism is closely related to materialistic dialectic and based on Marxist-Leninist philosophy" (p. 111), he names almost exclusively geographers from Moscow University. His scornful, haughty attitude toward the work of all "unlike-minded" results in narrow-minded and one-sided statements.

There is a great deal in Anuchin's book that is interesting and true, but he often uses undisputed facts and views to arrive at unjustified conclusions that are irreconcilably opposed to what was stated earlier. One gets the impression that the author did not try to find objective truth on the basis of a generalization of experience, but marshaled factual data and philosophical concepts in support of previously formulated conclusions.

Throughout the book, for example, the author presents what is generally a correct picture of the interrelations and interactions between nature and human society. But he assumes without any justification or proof that human society is part of the "earth's landscape envelope," while in reality these two concepts are of different quality. The author assumes that "economic geography studies combinations of social elements of the earth's landscape envelope, expressed mainly in the form of territorial production complexes" (p. 114). That statement contains one of the author's fallacies. It stems from a confusion of natural and social categories. The author incorrectly understands both the term "nature" and the term "human society." It is too bad that we have to return to a long-past stage of the discussion and talk about things that are quite elementary and clear.

The term "nature" can be used in two senses.

(1) Nature is the material world that surrounds us, the universe, which is in constant motion, change and development. Man and his reason are the highest accomplishment of nature. Human society represents a specific part of nature subordinated to its own laws. If we understand nature in that sense, then human society can be said to be part of the concept "nature," but it would be wrong to say that the laws of nature act on society or that the laws of society act on nature. The laws of nature act on man as a biological individual, but they do not act on human society, or on social categories in general.

(2) Nature in the narrower sense is the inorganic and organic world studied in natural science. Human society is not part of this narrow concept of nature; nature creates and forms the geographical environment of society and is the material basis for the existence of society. Nature does not have and cannot have any "social" elements; a canal dug by man, the land worked by man, the vegetation planted by man, and so forth, are not "social elements" because they are not part of human society and their development proceeds according to natural and not social laws (water flows by gravity, etc., and society perceives and utilizes these laws for its own purposes). The fact that nature acts on society and society changes nature does not affect the character of the laws acting within nature and society.

Anuchin's basic mistake, derived from the "environmentalists," is that he considers human society as a product of nature and as part of nature, subordinated to the laws of development of nature. Actually society is an association of people combined by common concrete historical conditions of material life. The origin of society was an inevitable result of the productive activity of people. In the process of production, people enter into certain social relationships through which they are linked to nature and through which production takes place. "The sum total of productive relationships forms what is called social relations or society, such a society is at a certain level of historical development; it is a society with a distinctive character" (Karl Marx, Collected Works, Russian edition, Vol. I, p. 63). According to Marx, it is society which forms productive relationships, and according to Anuchin, it is nature. One of the main conclusions reached by Anuchin is as follows: "The laws that determine the development of the organic group of elements also act on human society (within the group of organic elements)" (p. 159). To agree with that point of view means to acknowledge that there exists a natural selection in society and that the "neo-Darwinists," who would apply biological laws to human society, are right; it would mean to acknowledge the correctness of insane racist ideas.

If Anuchin had not repeated this idea in several places in his book, it might have been regarded as an oversight, as an inapt expression of thought. But as matters stand, it looks like an example of penetration of bourgeois ideology.

The historical survey of geographical ideas offered by Anuchin suffers from "Europocentrism"; there is not a word about the geographers of China and India. In several cases, Anuchin ascribes his own views, without any foundation, to the classics of geography. That applies to Lomonosov (p. 35), Varenius (p. 33), Elisée Réclus (p. 45) and Humboldt (p. 62).

Anuchin did not use the fruitful ideas of Soviet landscape science. He tries artificially to exclude from the sphere of physical geography the "biological elements of the geographical environment" (p. 159) and thus to render impossible the integrated study of landscapes. The following view expressed by N. N. Kolosovskiy, cited and shared by Anuchin, sounds more than strange: "Moreover, in some cases, the drainage net, the soil cover,

vegetation and animal life may be entirely destroyed by industry, roads, and cities, the relief may be altered, entire mountains may be razed, and landscape zones will then be studied only on a paleogeographic level" (p. 141).

Landscape zones exist objectively on the earth's surface, regardless of the will of man, and depend, in the final analysis, on the inclination of the earth's axis to the plane of the ecliptic and the resulting differences in the distribution of solar energy. They can be destroyed only if the earth disappears or the sun becomes extinct. Human society can make all the changes it wants in nature, transforming "natural" landscapes into "cultural" landscapes, but landscape zones will still remain. It is amazing that such antigeographic concepts can be stated by those who represent themselves as "defenders" of geography against unknown opponents (who are not once identified in the book).

We cannot agree with Anuchin's understanding of the stages of development of human society. "Man's domestication of animals and the beginning of plant cultivation also led to a new stage both in the history of mankind and in the history of development of the whole organic world and the entire geographical environment, to the establishment of an entirely new type of relationship between society and the rest of nature and to the creation of an entirely new geography of all living nature, including human society itself" (p. 132).

In the first place "living nature" can include man only as a biological organism, but not human society; secondly, the development of the geographical environment and that of human society proceed under different laws, and therefore no common stages of development can be defined for both society and the geographical environment; third, stages in the development of human society do not differ with regard to what they produce but how they produce and what labor devices they use. This has been stated many times by Marx and is a truism for every Marxist.

Anuchin cites often, and in most cases irrelevantly, quotations from the classics of Marxism-Leninism, but on a methodological level he defends what are essentially ideas incompatible with Marxism.

Against whom is Anuchin fighting and what is he trying to prove? The need for integrated geographic research? The close relationship between physical and economic geography? But who is disputing that? Who is denying it at the present time? If Anuchin meant by "unified geography" a system of geographic sciences containing both natural sciences (physical geography and its branches) and social sciences (economic geography and its branches), in which fundamentally different laws are operating, then there would be nothing to argue about. You want to call it "unified geography" -- please, go ahead; only don't apply to society the effect of the laws of nature, or to nature the effect of the laws of society. But the point here does not lie in terminological differences; it is a matter of incompatibility between Anuchin's ideas and Marxism.

Anuchin writes: "In the capitalist countries a tendency to separate physical and economic geography has begun to make itself felt especially in recent decades, as reflected in the general striving of bourgeois philosophy to pass from determinism to indeterminism. The 'wall' between the natural and social spheres of bourgeois science at the present time is closely related to the tendency to deny the existence of objective laws that guide the development of both nature and society" (p. 107). Such a statement is designed for people who are completely unfamiliar with the foreign literature. In the field of geography there is no "wall" between physical and economic geography in capitalist countries; on the contrary, ideas are rife abroad of a "unified geography," subordinating the development of human society to the effect of the laws of nature and considering physical and economic geography as branches of a "unified science." All one has to do is to read the works of Hartshorne, Russell Smith, Bowman, Davis, Freeman, Phillips and many other contemporary American writers on the theory of geography to realize that. And that point of view is also defended by Anuchin.

G. S. Nevel'shteyn. Anuchin's book examines the important question of ending the isloation of economic geography from the other branches of geographic science. This question has practical importance even now. At the same time the book contains many shortcomings and lacks proof of many stated propositions. In several places, especially in Chapter 6 (on the methodology of economic geography), there are contradictions, a scholastic method of exposition, virtually no examples and incorrect definitions of several concepts.

The question of the geographical division of labor is not clearly stated. Also incorrect is the opposition of two forms of social division of labor: the one caused by the class divisions of society and the other caused by interactions between nature and society. Under capitalism both forms have a class character. In the case of communism, it is also incorrect to oppose the geographical division of labor to a "technical-economic" (?) division based on "interactions of an intra-societal character" (p. 183). Several incorrect statements are also made regarding regionalization (p. 184 ff.). Anuchin holds that in addition to physical-geographic and economic-geographic regionalization there are also special regions with "certain common characteristics in nature, society and the social-economic life of the population" whose boundaries "coincide sometimes with physical-geographic boundaries and sometimes with economic boundaries." This third kind of regionalization is simply economic regionalization taking account of political, historical-geographic and ethnic factors. On pp. 172-72 the author makes a difference between economic-geographic regionalization and governmental ("administrative-economic") regionalization, stating that the finer the breakdown the less it is economic-geographic. That statement is completely unfounded and contradicts (as do so many other statements in the book) the practical trend of economic regionalization.

It is incorrect to call the "technology of production" a productive force (p. 180).

The question of the study of productive relationships in geography is presented in a confused way. On the one hand, the author asserts that "geography does not especially study social relationships" (p. 186); on the other hand, he says that "geography inevitably must include within its sphere of interest many questions related to the study of productive relations" (p. 184). Evidently the author does not understand that the territorial division of labor, which is especially studied by economic geography, belongs in the category of productive relations. It is quite contradictory to say that "economic geography, as opposed to the economic sciences, does not study social relations" (p. 187), and then to say on the same page that "the subject of study of economic geography is the social elements of the geographical environment (population and economy)."

One cannot agree with the author's designation of all those who do not share his ideas as economists rather than economic geographers.

V.K. Chukreyev. The basic shortcoming of Anuchin's book, in my view, is the absence of factual data, without which the significance of his ideas cannot be assessed. The basic philosophical questions of physical geography (to be sure, without references) have been rather clearly stated in S. V. Kalesnik's book Osnovy obshchego zemlevedeniya (Principles of General Earth Science).

A positive aspect of Anuchin's work is the desire (common to all geographers) to look at all phenomena in their interrelationships, but the time has now come to advance from general statements to the language of measurable magnitudes, identifying the principal links between individual phenomena in the development of the earth's geographic envelope.

A. V. Darinskiy. Anuchin's book merits a positive assessment. Attention should be drawn to the sections devoted to the practical applications of geography. Anuchin's book does not regard geography in opposition to physical and economic geography, but as a new discipline that has arisen on the border line between physical and economic geography. Such a discipline could furnish the theoretical basis for land-use studies, vertical planning, land appraisal and other practical work.

The choice of the name "geography" for such a discipline is not very apt and causes misunderstanding.

On April 13, 1961, the Geography Faculty of Leningrad University convened a joint meeting of the Departments of Physical Geography and Economic Geography to discuss Anuchin's book, which had been presented as a dissertation for the degree of Doctor of Geographic Sciences. In addition to staff members of both departments and other members of the faculty, the meeting included V. A. Anuchin, Docents D. I. Koshelevskiy and A. T.

Khrushchev of Moscow University and Professor I. I. Ivanov-Omskiy of the Philosophy Faculty of Leningrad University.

The discussion was kept on a plane that did not depend on whether or not discussants agreed with the substance of Anuchin's theoretical statements. The discussion was designed to determine: (1) what new contribution Anuchin's book made to science, and (2) how strictly and how scientifically the author had presented arguments supporting his concepts.

Staff members of the Departments of Physical Geography and Economic Geography of the Geography Faculty of Leningrad University decided unanimously that Anuchin's book did not meet the requirements of a doctoral dissertation.

THE CONCEPT OF LANDSCAPE AND LANDSCAPES OF DIFFERENT ORDERS

By Yu. K. Yefremov

(From Geografiya i Khozyaystvo, No. 9, 1961, pp. 74-81)

(Abstract: The paper is an expanded version of a Lomonosov lecture given April 12, 1956, in the Earth Science Museum of Moscow University. Yefremov criticizes the confusion derived from the dual meaning of "landscape" as used by Soviet geographers: (1) landscape as an areal unit of varying taxonomic rank constituting a complex of all components that interact within the earth's surficial sphere (or landscape sphere), and (2) landscape as an indivisible basic areal unit, or "molecule," or "cell" of physical geography. Yefremov defends the first and assails the second point of view.)

The appearance of a contemporary landscape geography was predicted by V. V. Dokuchayev when he wrote about the inevitable development of a science dealing with relations between phenomena that would constitute "the greatest and highest fascination of natural science." Dokuchayev's conception of such a complex involved the interaction between climate, waters, vegetation, soils, substrata and the activities of man regardless of the size of the area. Dokuchayev did not establish any spatial norms (size or taxonomic rank); he was interested in the existence of a complex of the above-mentioned components over any area.

The term "landscape" admirably expressed the full range of Dokuchayev's thinking (although he himself did not use the term) about mutual relations between these components and proved to be very convenient when applied to integrated geographic descriptions of areas. An analytical survey of the

natural components of an area could now be concluded with a synthetic landscape description. This led many geographers to regard the study of landscape as the ultimate aim and the basic objective of physical geography. Since then we have had a dual meaning of the term "landscape" -- first, as a broad, general concept equivalent to natural complex, and second, as a designation for enclosed, internally homogeneous areal subdivisions corresponding to a certain taxonomic rank.

Let us recall that L. S. Berg, in reducing Dokuchayev's theory of the natural complex and its zonality to more concrete terms and developing it into the theory of landscape zones, understood the term "landscape" not only as a "geographical individuum" but also as a very broad category embracing various taxonomic ranks. In addition to lower-order landscapes, such as the spruce and wood-sorrel complex or the hillocky sands complex, Berg recognized the existence of higher-order landscapes (for example, the entire Middle Siberian plateau or the entire Valday upland). Berg distinguished first-order and second-order landscapes. Thus only landscapes of various orders were taxonomically restricted while the term "landscape" itself was treated as a more general category. (Many authors regard as Berg's last word on this question his paper "Facies, geographical aspects and geographical zones" (Izvestiya VGO, 1945, No. 3) with a taxonomically restricted concept of landscape ("aspect"). But it is evident from the new edition of his Geografischeskiye zony SSSR (Vol. I, 1947), published while he was still alive, that this narrow point of view did not exclude the previous broader concept.) The same distinction was accepted by B. B. Polynov, who contrasted his "elementary landscapes" with landscape as a general category.

In this broad, though not strictly defined meaning, the term "landscape" passed into Soviet geographical literature. (In many works by B. F. Dobrynin, A. A. Borzov and some of A. A. Grigor'yev's studies, the concept "landscape" is used predominantly in the taxonomically restricted sense. However, the entire collection of articles V. V. Dokuchayev i geografiya, published in 1946 by the Academy of Sciences USSR, treats the term "landscape" in the broad sense.) The term conveyed first, similarity of meaning with the equally common, though more superficial term "terrain," used in a completely identical sense in topography and military science, and, second, similarity with "landscape" as employed in everyday usage in the sense of "scenery." Naturally, the scientific concept of landscape is deeper and broader than the everyday concept since it includes both visible and invisible aspects of reality. Scenery or view is only the observable part of landscape. A geographer talking about landscape also sees in it geological structure, soil morphology, ground waters and complex interrelationships between the environment and the organic world (including micro-organisms, i.e. properties that are only obliquely and not always evident in scenery).

Factors acting in landscape are not only interrelated but may be entirely unrelated to one another. Independently existing endogenous and exogenous sources of energy may in their joint effect produce both completely har-

monic laws and entirely accidental coincidences or even contradictory relationships. A multitude of disharmonic features may also be produced in landscape through other internal contradictions, for example, between "inert" and living nature, between old and new, and so forth.

Landscape in that sense represents the nature of any section of the earth's surficial sphere, including all changes produced by human society. In other words, the term "landscape" is broader than "natural complex" (which can be synonymous only with "natural landscape"). Landscape is a historically shaped and developed complex of all components interacting in the earth's surficial sphere through the entire vertical extent of that sphere.

The predominance of landscape relationships within that sphere justifies the designation of the entire surficial sphere of the earth as the landscape sphere (Yefremov, 1950 and 1959; Kalesnik, 1955).

Landscape is just as broad a concept of a type of phenomena as relief, mineral resources, climate, soils and vegetation. It is as much the sum-total of properties of a section of the earth's landscape envelope as climate is the sum-total of properties of a section of the atmosphere interacting with the underlying surface.

Some geographers (N. A. Solntsev, Yu. G. Saushkin, A. G. Isachenko, I. M. Zabelin and others) oppose to the above-described point of view in some of their work a sharply different and more restricted meaning of "landscape." They apply it only to a certain taxonomic level of regionalization and regard that level as a qualitatively distinct unit that cannot be further subdivided without losing some of its integral features. According to these authors, some integral features are lost even when "indivisible" landscapes are combined into units of higher rank. From such statements these authors draw the far-reaching conclusion that landscape (in the taxonomically restricted sense) is the basic unit of physical geography, its molecule or cell; this in turn suggests the extreme restriction of the whole subject of landscape science to large-scale research on relatively small areas.

This dispute regarding the extent to which landscape should be restricted in the taxonomic and areal sense would be simply a matter of terminology if it did not directly affect the course of development of Soviet geography and the way it can meet practical needs.

The harm is not caused only or so much by the terminological confusion that makes geographical studies hard to understand or subject to contradictory interpretations even among specialists.

Landscape in the broad sense is actually the principal object of study in geography. But artificial limitation of the landscape concept to a single taxonomic level also restricts the subject matter of geography and its aims. This disorients geographers, forcing them to concentrate attention on empirical study of particulars at the cost of studying higher-order landscape units.

Such withdrawal of entire geographic schools from the study of large areal units is one of the reasons for the considerable lag of Soviet regional geography and one of the reasons for the lack of multi-volume geographies of the USSR and of the world on our bookshelves.

But perhaps such "micro-landscape science" benefits practical needs? After all, large-scale mapping of small areas is becoming increasingly important in connection with study of local economic conditions for practical purposes. Hence the emphasis on such topical studies as qualitative land appraisal, the creation of a cadaster of natural conditions (i.e. a landscape cadaster) of a given oblast, rayon, collective or state farm and so forth. Large-scale landscape surveys of key areas are also indispensable for small-scale studies of large territories.

Yes, "micro-landscape science" is undoubtedly needed, not instead of, but in addition to "meso-" and "macro-landscape science." However, even micro-studies suffer just as much as meso- and macro-studies from the fact that landscape has been declared to be further indivisible and thus the "basic" unit. After all, such "landscapes" are not necessarily suited for all purposes and all scales of investigation. In qualitative appraisal of farmlands, facies may be more important than "urochishche" and "landscape." (Editor's note, S.G.: N. A. Solntsev, Soviet landscape geographer, has proposed the terms landscape, urochishche (locality), zveno (link) and facies as taxonomic levels of natural areal units in descending order.) The confusion and vagueness of landscape terminology has already been responsible for preventing the application of landscape study methods to the work of land-use agencies.

Those favoring a taxonomic restriction of the landscape concept often accuse their opponents of denying the existence of landscapes as natural areal units delimited by definite boundaries. Such an accusation is made, for example, by I. M. Zabelin in his Teoriya fizicheskoy geografii (1959, p. 214).

Actually the opponents of taxonomic restriction of the landscape concept do not in any way deny the existence of landscape as an integrated concept of modern geography. On the contrary, they tend to emphasize the great complexity of the picture and the existence of a multitude of subordinated landscape units identical in complexity; they are only against making a fetish out of a single, supposedly basic level of the hierarchy. The adherents of such views not only do not reject territorial restrictions of landscape, but insist on two ways of making such restrictions: a typological method, distinguishing regularly recurring landscape types (similar to types of relief, vegetation, soils and so forth), and an individual approach, distinguishing unique landscape countries, krays, oblasts, rayons, subrayons and any number of intermediate units, such as suboblasts, groups of oblasts and so forth.

Any level of both the typological and the individual division and combination of landscapes actually exists. It is delimited by natural boundaries

and combines within itself a group of features of an integrated character, i.e. the landscape community. Within the typological series, therefore, we are equally justified in speaking of such landscape units as the landscape zone of the middle-latitude deserts, the landscape subzone of the southern desert (transitional to the subtropics), the landscape of sandy deserts (a group of landscape types), the landscape of hillocky sands (a landscape type), the landscape of sand ridges and the landscape of inter-ridge depressions (a landscape subtype or a type of urochishche), and so forth. What justification is there for labeling any of these levels as "basic" or "essential" for the geographer?

Just as real and territorially bounded are the individual landscape complexes or regions of various orders, expecially since they represent unique combinations of landscape types.

In talking about the climate of the Russian Plain, we in no way deny its diversity, but simply note the existence of common features. Only when we seek to identify differences can we speak of climates of the Russian Plain in the plural (i.e. the various climate types and the various climatic regions). Just as real is the landscape of the Russian Plain, although it represents a complex association of such typological landscape categories as landscape zones, and individual categories, such as landscape krays, oblasts and rayons. The Russian Plain exists as a single higher-order landscape -- the landscape country -- and differs from adjacent countries because of the unity of its platform structure, the long inherited plains character of the relief, its paleomorphological zonality linked to the influence of Pleistocene glaciation in the north and its absence in the south, the distinctive air-mass circulation (for example, the absence of barriers to Arctic invasions) and so forth. Is such a concept of the landscape of a huge country really inferior in its integrated character to Solntsev's concept of a much lower-ranking landscape? Incidentally, the concept "landscape," as understood by him, is also not homogeneous and represents a combination of "morphologic units," such as urochishche, and their finer subdivisions -- zveno (link) and facies. With equal justification we should be able to speak of the landscape of the Northwest group of krays of the Russian Plain, or the landscape of its Baltic-Valday kray, or the landscape of an individual oblast, for example, the Silurian-Ordovician plateau. In each one of these examples we find the same diversity of factors and mutual relationships between natural features.

In pursuing the further landscape division of a territory by dividing, say, landscape oblasts into suboblasts, okrugs, rayons, subrayons, and so forth, down to micro-rayons, we evidently pass at some point that "fatal" boundary or level that some landscape scientists declare to be "basic"; it usually coincides with a landscape rayon, a subrayon, a group of rayons or an okrug of the above-mentioned regional scale.

In what way, however, are Solntsev's zveno and facies, the subdivisions of his "basic" level, less complex than his "landscape"? Why should a floodplain in a small ravine be designated as a facies and a floodplain in

a large valley merit the rank of urochishche or even the rank of landscape? Where are the criteria and norms for limiting these concepts? There are none for the simple reason that qualitative boundaries do not exist in reality.

Attempts have been made recently to justify the qualitative distinctiveness of the "landscape level" of the taxonomic hierarchy by a complete range of zonal phenomena, and it is asserted that below a certain level, i.e. in subdividing the "landscape," that completeness no longer exists. For example, A. A. Grigor'yev, in equating the concepts "landscape" and "landscape rayon," writes:

"The landscape (landscape rayon) is distinguished among the other taxonomic areal units as the minimal natural area having all the basic features, all the components characteristic of the given zone or the given altitudinal belt. In any further subdivision of the area, some of the components characteristic of the geographical environment of the given zone drop out, and the area thus loses the above-stated basic character of landscape as a separate taxonomic unit. Landscape is thus characterized by a relative (though not absolute) indivisibility. This property of landscape allows us to regard it as a basic geographical individuum representing the smallest geographical taxonomic areal unit. Usually the area of landscape is so large that it can be divided into several sections, each representing component parts of the landscape but lacking the sum-total of the characteristics of the given zone. The division of landscape into such sections is already tantamount to anatomization" (A. A. Grigor'yev, "On some basic problems in physical geography," Izvestiya AN SSSR, seriya geograf., 1957, No. 6, p. 7).

It is no accident that the author does not cite a single example. Can you imagine any "anatomic" part of landscape, whether facies or urochishche, that does not contain "the sum-total of the characteristics of the given zone"? Which of the zonal components of landscape could be absent in a facies or an urochishche? After all, no matter how small a part of the facies you take, it must contain zonal features of climate and microclimate; one cannot imagine either an urochishche or a facies that lacks soils or subsoils. Even intra-zonal and azonal physical features always bear the imprint of zonal influences; in short, the assertion that there are sections of "landscape" that lack the sum-total of characteristics of the given zone is not substantiated by facts.

I. M. Zabelin made an equally unconvincing attempt to justify the qualitative characteristics of the "landscape level." He regards the homogeneity of the constituent components as a quality limiting the divisibility of "landscape." He cites as an example of such homogenous components a tree cover with a certain type of undergrowth "on a uniform slope with rock outcrops." To this homogeneity of components he opposes the heterogeneity of landscape elements (such as "plant species") that undergo directed changes (I. M. Zabelin, Teoriya fizicheskoy geografii, Moscow, 1959, pp. 209,210. In order to understand the author's argumentation, it must be borne in mind that he has adopted an unusual terminology, assigning, for example, a very

limited meaning to such long established scientific terms as landscape complex, component, element and so forth). According to Zabelin, heterogeneity of a component means that the landscape has lost its basic inherent quality. Heterogeneous "landscape elements" furnish the basis for further subdivision of the landscape into facies.

Such reasoning would be convincing if the phenomena within each component really lent themselves to such an undisputed and primitively dual classification. But which of the taxonomic levels in the characterization of the plant cover is to be designated as a component, or as a formation, or as a group of associations, or as an association? And what if there are several such levels? At what level of the hierarchy do rocks cease to constitute a component? At what level of the hierarchy does a component lose its properties and break down into elements of the soil cover?

Much also depends on what classifications of components are used as the basis for such schemes. Be that as it may, Zabelin distinguishes seven components in landscape. Even if it were possible to determine within each one the objectively existing qualitative boundary between the "component state" and the subdivision into elements," where is the guarantee that these heterogeneous, variously caused boundaries would be commensurate in the landscape complex?

All these boundaries at which "components" break down into "elements" in Zabelin's scheme are just as problematical and just as subjective as the lower limit of divisibility of "landscape" in Solntsev's scheme.

It is very revealing that there is no agreement even among those who favor a taxonomic restriction of the landscape concept. Some of them (K. I. Gerenchuk, A. A. Grigor'yev, Yu. G. Saushkin and others) consider it possible to equate landscape with the "rayon," while others like Zabelin, write that a rayon consists of landscapes. Each side considers its "cell" to be the basic unit or "individuum" of geography.

Similar confusion exists in views regarding the magnitude of landscape. Solntsev distinguishes in the center of the Russian Plain several "landscapes" having areas of hundreds of square kilometers. Zabelin measures his "landscapes" in terms of thousands of square kilometers if the physical criteria remain uniform over sufficiently large areas, and in hundreds of square meters if the natural environment is complex. In the latter case, as in most examples cited by Zabelin in his Teoriya fizicheskoy geografii, he speaks of units that correspond to Solntsev's urochishche. And so we find complexes of phenomena of various taxonomic ranks claiming to be the "basic" unit.

Rather revealing is the argument, on pp. 212-13 of Zabelin's book, between the two proponents of taxonomic restriction of the landscape concept (Solntsev and Zabelin) whether there is one or two landscapes in the valley of the Ruza River. Actually the valley contains both Zabelin's two landscape types and Solntsev's single landscape type of a higher rank formed

by the repeated association of the two other types. So, what is the argument about? Simply about whether one or the other unit should be called "basic"? Is there any need to show how fruitless such scholastic arguments are when it comes to practical application?

Let us recall, incidentally, that in no special-purpose regionalization (soils, geobotanical or any other) is an attempt made to designate a given level in the taxonomic scale (oblast or rayon) as basic and indivisible, and certainly no attempt is made to use the name of the basic object of study (climate, soils or vegetation) to designate the rank of a taxonomic level. No one, for example, divides soil provinces into "soils" or climatic regions into "climates."

It is just as far-fetched to try to restrict the subject of landscape science to just one of the levels of regionalization. If "landscape" is simply a synonym for rayon, then landscape science is simply "rayon science." And in that case "oblast science" and "okrug science" could also claim to be separate sciences! Of course, this would not happen for the simple reason that all these regional levels, like the taxonomically restricted "landscape," lack a specific personality.

Neither Solntsev's "landscape" nor the rayon in the scale of individual regionalization nor the landscape type in the typological scale constitutes a qualitatively separate level that should for some reason be preferred to other levels. D. L. Armand has cleverly compared the taxonomic scheme of landscape subdivisions with a stairway in which each step may, but need not necessarily, differ in size from adjoining steps and does not claim to be a "stairway landing" (D. L. Armand, "Principles of physical-geographic regionalization," Izvestiya AN SSSR, seriya geograf., 1952, No. 1). No matter whether the taxonomically restricted "landscapes" are understood as landscape types or as landscape rayons, they also lack the qualities of a "stairway landing." The scale and the purposes of research in objectively existing landscape units are sufficient to determine both the principal object of study and the lower limit of regionalization.

Those in favor of restricting the landscape concept say: "Are there not molecule and atom in physics and chemistry? Are there not species in biology? Are they not the basic units of the corresponding sciences? How can there be geography without such a basic unit?" But the point is that molecule, atom, rock, mineral and species constitute within their taxonomic systems objectively existing "units" that lose their essential properties if further subdivided. For example, the species is separated from the genus in biology in terms of the difficulty of interbreeding between different species. There are no such boundaries in the "landscape" of Solntsev and Isachenko or in the "cellule" of Saushkin. The desire to proclaim the need for the existence of such boundaries, just so that geography may have its own indivisible "molecule" or "cell" is a far-fetched and unnecessary tendency in science and practice.

In general, is it possible to find the lower limit of landscape subdivision? Theoretically the subdivisions of landscape are finer than needed for practical purposes and also finer than can be studied by geographical methods (without going into the sphere of the micro-world). Let us try to prove this by the rule of contraries.

Where would it be most natural to find the smallest areally limited landscape complex? Evidently within an elementary surface, a kind of "atom" of the relief. Such elementary sections -- the facets of relief -- actually exist and are represented in geomorphic mapping although it should be recalled that there also exist curved surfaces as the sums of infinitely small facets. But even an elementary, uniformly inclined slope has different hydrological, geomorphic and microclimatic characteristics at its upper and lower extremities. In other words, even within its limits there are differences in soil varieties and in plant cover; in other words in landscapes!

The edges of any level area on a valley bottom receive a greater amount of runoff from the slopes than its center, and part of the valley bottom is expecially shaded by adjacent slopes. And even a completely unshaded level area on top of a table mountain cannot have an indivisible landscape since its edges, near the brink, are inevitably better drained than the center of the area. Wind is another factor making for lack of uniformity in conditions because it blows dust and drifts snow unevenly in different places.

It is possible that the desire to assign to "landscape," as an association of urochishche, the role of "basic unit" stemmed from geographers who limited their research mainly to the central parts of the Russian Plain. In that area it was correctly noted that the facies and urochishche were simply morphological parts of the landscape, simply parts of the locality, but that at the next highest stage of combination we obtained a picture of the "locality as a whole" as an association of, say, gently rolling, secondary-moraine interfluves (with one set of urochishche) and broad terraced valleys (with another set of urochishche). That transition to the "locality as a whole" creates in the center of the Russian Plain the illusion of a qualitative "break" on the boundary between the urochishche and "landscape" categories. But even that system cannot always be accommodated in Solntsev's three-level scheme, and he is forced to distinguish intermediary levels, such as the zveno. Elsewhere, for example, in the southwest of the Russian Plain, the picture gets more complicated, and K. I. Gerenchuk finds it necessary to talk about a two-row and multi-row stepped (terraced) structure and a ridge-and-hill structure of "landscape" (rayon) (K. I. Gerenchuk, "On the morphological structure of the geographic landscape," Izvestiya VGO, 1956, No. 4).

Gerenchuk places an additional taxonomic level, the "locality" (mestnost') between urochishche and "landscape," so that the "basic" unit is at the fourth, rather than the third level of the hierarchy. That is made necessary by the natural complexity of the southwest of the Russian Plain.

If we were to use the same logic in attempting to cover with the concept "landscape" the sum-total of a natural complex, say, in such complicated mountain country as the Western Caucasus, with its altitudinal zonality, its exposure, barrier and tectonic-lithological zonation and several other forms of spatial differentiation of the landscape sphere, then a hierarchy of five or six levels of subordinated units would be required to arrive from the facies at the "locality as a whole." Actually the very concept "locality as a whole" is subjective and depends often on the scale and the purpose of the research. Why should it be correct to include in "landscape" (the basic unit) a whole set of altitudinal landscape zones, but incorrect to include in "landscape" just as real and legitimate an association of urochishche covering a wide area only within a single snow-and-ice or single subalpine zone?

The best way is to stop this fruitless search for the "smallest" and supposedly basic unit of geography. The principal object of study of our science is landscape of any rank, up to the entire landscape sphere of the earth. The "units" should be both a subordinate series of landscape "types" and individual landscape regions of various ranks.

The controversy presented in this paper has not been without result. The existence of landscapes of different orders is being acknowledged by an increasing number of geographers (D. L. Armand, F. N. Mil'kov, V. I. Prokayev, Ye. N. Lukashova and others). N. A. Gvozdetskiy, in offering his "typological concept" of landscape, in essence is also protesting against its taxonomic restriction and is speaking about landscape types, thus coming close to those in favor of a broad landscape concept.

K. G. Raman applies the term "landscape" to territorial complexes of various taxonomic ranks, though only small areas, which he calls facies, groups of facies, sub-urochishche, urochishche and so forth, and speaks of the landscape of an urochishche or the landscape of a facies just as he would speak of the landscape of a rayon (K. G. Raman, "An attempt at classification and typing of geographic landscapes as a basis for physical-geographic regionalization," Uch. zapiski Latviyskogo universiteta, Vol. XXVII, 1959, geogr. nauki, II, No. 8). In the same way one can speak of the landscape of an oblast and a country or the landscape of a zone, a subzone and a belt. During a field trip of the Fourth All-Union Conference on Landscape Studies in Riga (1959), K. G. Raman demonstrated convincingly the correctness of his views through many examples in the field, supporting them with large-scale landscape maps. The most valuable aspect of Raman's research is its tie-in with practical economic needs and the demonstration of the practical applicability and effectiveness of such a non-taxonomic treatment of the landscape concept.

S. V. Kalesnik advanced in 1955 from his previous support ot taxonomically restricted landscapes to a compromise accepting the correctness of both points of view. In the second edition of his Osnovy obshchego zemlevedeniya (Principles of General Earth Science), the author writes: "Every landscape of any taxonomic rank is related to the entire earth surface as a part to its whole" (p. 10).

Kalesnik defines geographic landscape as follows: "It is a section of the earth's surface, differing qualitatively from other sections, delimited by natural boundaries and representing an integral and mutually caused legitimate association of objects and phenomena that is typically expressed over a considerable area and is intimately related in all respects to the landscape envelope" (p. 455).

It is very important that Kalesnik considers this definition of landscape as belonging "above all to the general concepts of geographic science." In support of Mil'kov, Kalesnik says that such a definition is equally applicable to any taxonomic unit in physical geography and is just as legitimate and necessary as the general concepts "climate" and "soil." However, Kalesnik also says that the term "landscape" can be "used also to designate a geographical individuum, i.e. the basic unit of physical-geographic regionalization and systematization." Kalesnik holds that "this does not cause any special inconvenience (except in the strictly formal sense) because it is clear in any given case whether one speaks of landscape in general or of a geographical individuum." It may be that such a conciliatory position was necessary in the textbook because the author had to reflect the existence of two different points of view. But such an approach is likely to promote the introduction of a contradictory landscape-science terminology into practice.

As far as the definition of "landscape" is concerned, it seems to us that Kalesnik erred in introducing into the definition the requirement of qualitative difference from other sections and the delimitation by natural boundaries. These requirements should be applied not to landscape but to its concrete spatial expressions, both typological and individual, i.e. to the area of the landscape type, the landscape rayon, the landscape oblast and so forth.

Landscape is not a section of an area, but the sum-total of the properties of that section.

Unfortunately in his paper at the Third Congress of the Geographical Society of the USSR in 1960, Kalesnik came out again in favor of a taxonomic restriction of the landscape concept (see S. V. Kalesnik, "The present state of landscape studies," Soviet Geography, February 1961, pp. 24-34). The paper produced a lively discussion and comments by N. A. Gvozdetskiy, F. N. Mil'kov, Yu. K. Yefremov, Ye. N. Lukashova, V. I. Prokayev, A. I. Spiridonov and others. It is interesting to note that even A. G. Isachenko, a partisan of taxonomic restriction of landscape, referred to his views only parenthetically in his paper at the same congress (A. G. Isachenko, "Landscape mapping," Soviet Geography, February 1961, pp. 34-47; in the reference on p. 35, Isachenko said he used "landscape" in the sense of basic physical-geographic unit "in accordance with the ideas of the Leningrad school, and also of A. A. Grigor'yev, N. A. Solntsev, K. I. Gerenchuk and other geographers" -- Editor, S.G.). His entire paper not only does not use the landscape concept in the taxonomically restricted sense, but actually

defines the aims of landscape mapping as the mapping of landscape units ("territorial complexes") of different taxonomic orders (p. 34). This is a good example of how one can get along perfectly well without making a fetish of the mythical "basic" unit. Yu. G. Saushkin also provides an enlightening example of the virtual rejection of taxonomic restriction of the landscape concept when he identifies landscape with the concept of geographic complex in the broadest sense (Yu. G. Saushkin, "On the study of landscapes of the USSR that have been changed in the process of production," Voprosy geografii, 1951, No. 51, pp. 292, 294 and others). Graphic examples, tested in practice, of how it is possible to get along without the notorious "basic unit" are provided by the constantly increasing work on qualitative land appraisal, which is landscape study at its best.

The interests of further development of the theory of Soviet geography and its service to practical needs require not the existence of mutually exclusive points of view, but rather a resolute adoption of a simple and clear scheme of typological and individual regionalization of landscapes of different orders and the extension of the aims of landscape studies to all ranks of natural complexes.

THE MINGECHAUR MULTI-PURPOSE WATER-MANAGEMENT PROJECT

By G. L. Magakyan

(From Geografiya i Khozyaystvo, No. 9, 1961, pp. 16-20)

(Abstract: The author develops a methodology for assessing in actual money terms the benefits derived from a multi-purpose river-management project by the various components of the project: power generation, flood control, irrigation, fisheries and transportation. The example used is the Mingechaur project on the Kura River in the Transcaucasian republic of Azerbaydzhan.)

A study of the conditions under which multi-purpose water-management projects are operated helps in determining the potentialities and ways of increasing their effectiveness to a maximum. From that point of view a discussion of the nearly eight years' operation of the Mingechaur water-management project is undoubtedly of theoretical and practical interest. It is equally interesting from the point of view of a technical and economic analysis of the interacting influences arising in multi-purpose projects.

The Mingechaur project includes power generation, irrigation, flood-prevention measures, water transportation and fisheries.

The power-generating equipment went into operation at its full designed

capacity immediately upon completion of the dam and, during its period of operation, has not undergone any substantial changes not envisaged by the design calculations. However, as more irrigated land is being developed with water from the Mingechaur reservoir, the operations of the power station will depend on the amount of water drawn off. With an annual power output of 1.4 billion kilowatt-hours, the Mingechaur hydroelectric station plays a key role in supplying cheap electricity to industry, agriculture and other sectors of the Azerbaydzhan economy. Its power supply has resulted in the complete electrification of almost fifteen rayons with a population of 300,000, an increase in labor productivity and, consequently, a general rise in productive forces. The transmission of almost a third of the power generated by the station to the Georgian republic further enhances the importance of the power plant as part of the Transcaucasian grid.

With the start of operations at the Mingechaur station, hydroelectricity was for the first time added to the Azerbaydzhan power supply, previously based exclusively on thermal stations. The hydro plant usually handles the peak of the load, thus assuring the other stations of even operations at or near their capacity through the year. However, when the Mingechaur plant carries the base of the load, or operates on a small load to economize water in the reservoir, then the thermal stations assume the role of load regulators.

The production parameters of the Mingechaur plant have in general reached the designed indices and are expected to remain substantially unchanged in the near future. The technical and economic calculations for the river project, without distribution of expenditures among specific use applications, were as follows:

Total capital invested	1,970 million rubles
Including investments for:	
irrigation headworks	275 million rubles
construction of objects transferred to other agencies (housing, repair shops etc.)	200 million rubles
recoverable sums	210 million rubles
power station and dam	1,285 million rubles
Installed capacity	371,000 kilowatts
Capital invested per kilowatt of installed capacity	3,470 rubles
Average annual power output	1,453 billion kilowatt-hours
Capital invested per kilowatt-hour	0.88 rubles
Annual outlays	29.69 million rubles
Including:	
amortization deductions	25.37 million rubles
operating costs	4.32 million rubles

Money income from average annual power output sold at regular power system rates	254.7 million rubles
Annual net income of power station	225.0 million rubles
Production cost of one kilowatt-hour	2.04 kopecks
Time period required for repayment of outlays (recovery of investments for dam and power station)	6.6 years

The construction of the Mingechaur dam and its storage reservoir now protects the Kura River plain against flooding, which earlier accompanied nearly every annual high-water stage, and against waterlogging of the land, which served as a malaria-breeding place along the Kura River. Malaria has now been eradicated and the area has been transformed into a healthy place. The government has been released of yearly nonproductive expenditures of almost 90 million rubles related to malaria infestations and anti-malarial measures. In addition the government is now saving average annual outlays of 10 million rubles for construction and maintenance of river dikes. Expenses relating to annual flooding thus amounted to nearly 100 million rubles before construction of the dam.

It should be noted that the diking of the river banks was made necessary by the fact that the Kura River, like all mountain streams, carried large amounts of suspended and bottom sediments from its upper course to its lower reaches. The amount of sediment carried by the Kura River was estimated at 14 million cubic meters a year. The sediment was deposited in the middle and lower course of the river where it had a gentle gradient and low velocity as it passed through the Kura-Aras lowland. As a result of the yearly accumulation of sediment, the Kura River flowed on top of a ridge that the river had built up in the area of the dam and farther downstream. When the water level of the river rose during high stage, the Kura left its channel and flooded huge adjacent areas. At the present time nearly all the sediments are deposited in the Mingechaur reservoir.

Calculations of the Mingechaur operations for the last eight years show that power generation and flood prevention alone have produced gains equivalent to twice the capital invested in the dam and the power station. This can be seen from the following figures:

Capital invested in power station and dam	1,285 million rubles
Capital invested directly in flood-prevention measures	none
Annual net income of power station	225 million rubles
Annual savings derived from flood prevention	100 million rubles

Total gain derived from power station and dam in eight years:

$(225 + 100) \times 8 = 2{,}600$ million rubles.

This amount is equivalent to twice the capital invested in the power station and dam.

The Mingechaur project also played a major role in irrigation of the adjoining semi-arid lands. The crop structure in the irrigated area is 25 per cent cotton, 20 to 25 per cent perennial grasses, 12 to 15 per cent corn, and the rest in small grains. Perennial plantings (vineyards and orchards) occupy 5 to 6 per cent of the irrigated land. Rice is cultivated on land provided with special flooding and irrigation devices.

The construction of the headworks of the Upper Shirvan and Upper Karabakh irrigation systems, which tap water from the Mingechaur reservoir, was completed only five years after the dam and power station. This delay affected, of course, the development of the irrigation component of the river project and the effectiveness of the project as a whole. The development of irrigation was slowed further by delays in the construction of distribution and other irrigation canals. Total capital investment required for the irrigation network over an area of 190,000 hectares amounts to 1,125 million rubles.

Because of the delay in the irrigation work, both the capital invested and the annual operating expenses of the project remained on the account of the power station. This led to an artificial increase in the power station's unit cost per kilowatt of installed capacity and per kilowatt-hour of generated power. The economic potential of the power station therefore made itself felt with a certain delay. Calculations must therefore be based at the present time on considerations different from those used in the original plans.

At the end of the planned period (10 to 12 years) the area irrigated with water from the Mingechaur project is expected to be 335,000 hectares. This figure has been envisaged by the State Planning Committee of the Azerbaydzhan SSR by 1970 within the irrigation zone of the Upper Shirvan and Upper Karabakh canals.

The planned irrigation area consists of:	
new irrigation area	135,000 hectares
reconstructed irrigation area	200,000 hectares
The average weighted irrigation area during the planned period	190,000 hectares
including:	
new area	80,000 hectares
reconstructed area	110,000 hectares
Additional capital investment required for irrigation and reclamation work, i.e. new irrigation systems and reconstruction of existing systems according to plans for Upper-Shirvan irrigation zone	
per hectare	5,920 rubles
for 190,000 hectares	1,125 million rubles

Net income derived from increase in farm output on reconstructed irrigation area:	
per hectare	1,402 rubles
from 110,000 hectares	154.2 million rubles
Net income derived from increase in farm output on new irrigation area:	
per hectare	4,485 rubles
from 80,000 hectares	358.8 million rubles
Total net income derived from increase in farm output	513 million rubles
Annual production cost of farm output:	
per hectare of irrigated area	809 rubles
from 190,000 hectares	158 million rubles

The value of the increase of output per ruble of production cost is 4.7 rubles. Applying this value to the total annual production cost (158 million rubles), we get:

4.7 x 158 million rubles	743 million rubles
Net increase in farm income per 1,000 rubles of capital invested directly in irrigation and reclamation work:	
per hectare of new area	466 rubles
per hectare of reconstructed area	138 rubles

Consequently the following indices of the irrigation component should be used in any future calculations of the effectiveness of the Mingechaur project for the given period of recovery of costs:

Gross value of farm output from the total average weighted irrigation area of 190,000 hectares	671 million rubles
Annual production cost	158 million rubles
Net income from irrigation (without counting percentage share of irrigation in total cost of river project)	513 million rubles

If we now use these irrigation indices in calculating the economical effectiveness of the Mingechaur project for power generation, flood prevention and irrigation, we get:

Capital invested in power station and dam	1,285 million rubles
Capital invested directly in flood prevention	none
Capital invested directly in irrigation including:	1,400 million rubles
headworks	275 million rubles
additional irrigation and reclamation measures	1,125 million rubles

Net annual income from power station	225 million rubles
Net annual income from irrigation	513 million rubles
Annual savings achieved through flood prevention	100 million rubles

Totaling outlays and income, we get 2,685 million rubles of outlays and 838 million rubles of income. Consequently costs will be recovered in 2685:838 = 3.2 years.

Any multi-purpose river project must take account of fishery needs in view of changes in the regime of the stream and regulation of the stream flow and in view of the creation of a large reservoir. The damming of a stream affects the living conditions of migrating fish, such as salmon and sturgeon, that spawn in the upper reaches of streams; stream-flow regulation reduces the high-water stage and thus reduces the area of water bodies in the floodplain; finally, the rise of the water level in the reservoir disturbs existing conditions in the spawning places. A multi-purpose project should therefore provide for the construction of fish hatcheries and fish-breeding installations.

An example of such measures may be found in the over-all plan for the renewal of fishery resources in the Kura River basin that was worked out in connection with the construction of the Mingechaur project.

The estimated cost of fish-culture and reclamation measures, amounting to 96.8 million rubles, was included entirely in the cost of the construction of the river project. Out of twelve planned projects included in the hatchery development program (according to data of Engineer A. V. Sadovskiy), eight projects were completed during the period 1951-56, two large projects (flooding of Kirov Bay and construction of the Varvara hatchery) are in progress and two others -- the Akera River hatchery and flooding of the Sary-Su lake -- have been postponed. A major Soviet program of commercial fish hatcheries has thus been virtually completed for the first time in the Kura River basin.

Considerable increases in the fish catch are expected as a result of completion of the hatchery program. These increases compare as follows with the fish catch of previous years (in thousand metric tons):

Average annual catch	Kura salmon	Sturgeon	Smaller fish
1926-35	0.25	3.31	16.38
1945-50	0.151	2.24	6.05
Expected after completion of power project but without special hatchery provisions	--	0.9	2.4
Expected as a result of special hatchery development program	0.6	5.4	15.45

Since 1953 the Kura River has been stocked with 260,000 artificially hatched fry whose age, weight and size corresponded to fry from natural spawning. In 1957 the fish catch in the Kura River included the first grown salmon of the 1953 stock (all the salmon fry of the Chaykend and Chukhur-Kabolinskiy hatcheries is marked).

We pointed out earlier that the Kura River fish-hatching program is the first carried out in the Soviet Union on that scale. Such a program should be made part of multi-purpose projects on other rivers. This would make it possible to make up for the temporary damage to fisheries and not only to maintain the catch at the previous level but to exceed that level considerably. Expansion of the fish catch rapidly helps to recover the relatively low capital investment in fish hatcheries and contributes in part to recovery of the investment in the river project as a whole.

The Mingechaur project is also of interest from the point of view of the construction of its reservoir, which has a capacity of 15 billion cubic meters and an area of 68,500 hectares. Reservoirs in the Soviet Union are classed in three categories according to their fish productivity:

	Productivity (kilograms per hectare)
Reservoirs of the northern zone (north of 58° N.)	5-20
Reservoirs of the middle zone (between 58° and 52° N.)	20-50
Reservoirs of the southern zone (south of 52° N.)	50-80

If we apply the southern-zone index to the Mingechaur reservoir, we can easily calculate its productivity, which would be about 6.5 tons for every 100 hectares of water area. That figure is close to, and in some cases even exceeds, the yield of livestock products on collective farms per 100 hectares of agricultural land.

In accordance with plans worked out by the Baku division of Gidroryb-proyekt, the Soviet fishery design agency, we obtain the following cost indices based on a total cost of 20.86 million rubles of fish-culture measures and an average estimated catch of 1,200 tons of fish a year:

Additional capital invested in fish hatcheries of the Mingechaur reservoir (hatcheries, channels, pumping stations, and so forth)	20.9 million rubles
Annual production costs	3.1 million rubles
Gross value of the annual output of fish (1,200 tons at 6,000 rubles a ton)	7.2 million rubles
Net income from fish culture (without counting percentage share of fish culture in total cost of river project	4.1 million rubles

It should be noted that the above-mentioned planned figures will in fact be exceeded. The actual catch in the reservoir rose from 105.6 tons in 1956 to 289.4 tons in 1957, or almost threefold.

The fish catch is expected to increase further both as a result of the normalization of conditions in the reservoir and the maintenance of the planned water area and as a result of improved conditions for fish culture, such as properly organized regular catch, correct handling, processing and transportation.

To complete our assessment of the Mingechaur multi-purpose project, a word should be added about its transportation component.

Navigation conditions on the Kura River have undoubtedly improved as a result of construction of the dam and regulation of the stream flow, especially in the Yevlakh-Caspian Sea section. This has been brought about not only by a more favorable channel regime of the Kura River, but by drawing off water from the Mingechaur reservoir to assure constant depths for vessels with a draft of 1.8 to 2 meters. Before construction of the dam, navigation on the Kura River usually ceased at low water (when the flow was less than 300 cubic meters a second) because depths on banks were one meter or less. The River Transportation Administration had to engage in annual dredging operations along the main channel in areas with heavy deposition of sediments. The construction of the dam improved navigation conditions both by providing a head of water for the lower reaches and by creating a permanent deep-water route in the reservoir. Unfortunately we lack the money data needed to assess the benefit of the project in that connection.

As far as the area flooded by the reservoir is concerned, it should be noted that it amounted to 53,300 hectares (plus 5,000 hectares of water area of the pre-reservoir stream). The flooded lands break down as follows (in thousand hectares):

Cultivated land	6.4	Gardens and private plots	0.234
Hayfields	1.3	Perennial plantings	0.043
Pasture and range	19.7	Unusable land (gullies etc.)	6.7
Woods and brush	18.9	Total	53.3

According to existing design norms, the total loss attributed to flooding was 33.4 million rubles. More than half of that amount was spent in cleaning the bottom of the future reservoir and preparing it for fish culture. These losses as well as the damage due to flooding of lands were added to the over-all cost of the river project. According to the methodology that has now been adopted, the over-all cost is distributed among the elements of the multi-purpose project in proportion to the benefits derived from the project.

SOME QUESTIONS RELATING TO THE FORMATION OF URBAN POPULATION

By V. Ya. Lyubovnyy

(From Geografiya i Khozyaystvo, No. 9, 1961, pp. 60-64)

(Abstract: In the absence of Soviet census data on processes of formation of urban population, the author analyzes the origins of industrial workers in four urban centers of Moscow Oblast. He finds that the extent of the labor-supply area depends on the availability of local labor, the character of the skills required, the traditional occupations and work skills of the population, and certain aspects of a planned economy, such as the compulsory assignment of graduates to specific jobs and areas.)

The process of formation of urban population is broad and multi-faceted. We will discuss here only some aspects of that prospect, notably, questions of territorial formation of the urban population. We know that the distinctive feature of cities is one qualitative indicator: the employment of the predominant part of the working population in nonagricultural pursuits, especially in industry. One way of analyzing the present composition of urban population and its processes of formation (in the absence of such data in census materials) is to use data describing the composition of factory personnel.

While doing research on the geography of population of several southeastern rayons of Moscow Oblast, the author studied primary sources on the composition of the personnel of the largest industrial plants of the cities of Kolomna, Shchurovo and Ozery and the workers' settlement of Beloomut. Most of the attention was concentrated on an analysis of the factors affecting both the formation of the areas supplying the industrial labor force and the character of the distribution of settlement.

The formation of personnel at the enterprises under investigation determined to a large extent the formation of the urban population; workers and office employees at these enterprises account for more than half the working population of each of the urban areas; in most factories the share of workers living in the city ranged from 70 to 100 per cent.

In studying the primary sources, we were interested especially in the areas of supply of the industrial labor force, formed under the influence of the following factors:

1. The area of labor-force supply extends increasingly farther out if requirements cannot be met from local labor reserves. The personnel requirements are quantitatively in direct proportion to the growth of the enterprise and its personnel turnover.

2. The area of supply may shrink or expand depending on requirements

regarding the skills of the labor force and the specific character of the product of the industrial enterprise. Some types of production require a higher level of education on the part of employees, others require specific knowledge and habits. Various specialized productions require sharply different sex and age compositions of the labor force.

3. Different factories, within a given factory even different departments and occupations, requiring special labor skills may be staffed with workers originating in different areas. That is explained by surviving differences, especially in the educational level of urban and rural population, and between persons originating in different areas. There are still differences in the minimum requirements of living conditions and the standard of living as a whole, which is still not uniform between urban and rural areas, and even among the rural areas. Since local conditions keep changing, traditional areas of labor-force supply may disappear and may be replaced by others, for example, as a result of changes in the specialization or technology of the enterprise, changes in the economic-geographic situation of the area, or a substantial increase in local farm income.

Usually there exist stable traditional ties between enterprises and certain villages that have supplied labor to a given enterprise over a period of many years. Another factor affecting the area of labor-force supply is the traditional classification of certain occupations into "male" and "female" categories. It should be noted that many occupations previously considered as "male" (weaving, tailoring, crane operators and so forth) have now become predominantly "female."

4. Under conditions of a planned Socialist economy the mutual relations existing between an industrial enterprise and its area of labor-force supply are affected by such factors as the organized recruitment of labor, recruitment in vocational schools, allocation of graduates of higher educational institutions, technical and trade schools, and so forth.

Let us illustrate these conclusions.

Our study area in the Oka River zone of Moscow Oblast is situated near the Oka-Moskva River confluence, with the diversified industries of Kolomna and Shchurovo, Ozery and Beloomut, and has a higher level of economic development than the areas adjoining to the north and especially to the south.

The industrial make-up of Kolomna, the principal center of the Oka zone, is determined by three machine-building plants: the Diesel locomotive plant named for V. V. Kuybyshev, the heavy machine-tool plant and the textile machine-building plant, which employ the greater part of the city's working population.

The oldest of the three is the Diesel locomotive plant, which will soon celebrate its centennial. Since its beginnings the plant has relied largely on labor recruited from nearby villages. These stable ties with the villages

have persisted to this day: out of the total number of employees at the plant only 19 per cent are natives of the city of Kolomna and 36 per cent of villages of Kolomna Rayon. The low percentage of Kolomna natives is also explained by the fact that some of the highly skilled personnel, predominantly of Kolomna origin, were transferred by the Diesel locomotive plant to the two other enterprises when they were established in the Soviet period.

The specialization of the three plants in terms of the bulk of the items produced also affects the personnel structure of the plants, particularly its sex distribution.

The share of women, for example, is higher at the textile machine plant, producing relatively light-weight items, than at the two other plants. The textile machine plant is the most "urban" of the three plants, with 38 per cent of the total labor force consisting of Kolomna natives. This is explained by the following facts. For the last sixty-five years, factories situated on the present site of the textile machine plant (before the Revolution a silk mill, and in the early Soviet period a phonograph factory) also had a high share of women among their employees, thus producing a relatively stable labor-supply area. Another factor was the location of the textile machine plant within the old city area, while the two other plants were located on the territory of former villages near the city's outskirts.

The total share of natives of Kolomna city and Kolomna Rayon is relatively high at the three plants -- 62 per cent at the textile machine plant, 55 per cent at the Diesel locomotive plant and 53 per cent at the heavy machine-tool plant.

The location of each plant with respect to transportation also affects the distribution of its labor-force supply. For example, the Diesel locomotive plant has a relatively high share of employees who are natives of Ryazan' Oblast and Lukhovitsy Rayon of Moscow Oblast, with which the plant is connected by bus and suburban railroad; a transportation link between the heavy machine-tool plant and Ozery Rayon of Moscow Oblast accounts for a considerable share of natives of that rayon in the plant's labor force.

Natives of areas situated outside of the Central Industrial Region play an insignificant role in the three plants; however there are some natives of the Central Chernozem oblasts.

The residence of the plant personnel depends on various factors: existence of housing, the availability of transportation, the family status of the workers, and their area of origin. Among the three study plants the highest percentage of urban residents (91 per cent) is found at the textile machine plant; at the Diesel locomotive plant, with its closer ties with nearby villages, the share of urban residents drops to 71 per cent. A large part of the workers of that plant live in villages situated up to 4 kilometers from the plant. A substantial number of workers also live near railroad stations up to 16-18 kilometers away (see map, p. 54).

Let us now see how the labor-supply area has changed in the case of Kolomna's oldest plant, the rope factory, which dates from before the 1861 emancipation of serfs. From the very beginning the ropemakers were made up to a large extent by natives of the village of Sasovo, Yelat'ma Uyezd, Tambov Guberniya, which had special ropemaking skills. Ropemaking required considerable physical strength and was therefore a male occupation. Sasovo supplied most of the labor force up to the 1930's. A turning point came before World War II and especially during the war years, when part of the production processes were mechanized. Mechanization, though on an elementary level, made it possible to replace some of the ropemakers with traditional skills by less skilled local workers. At the present time the factory employs only a few natives of Sasovo while the others are natives of Kolomna Rayon (42 per cent of the total) and Kolomna city (20 per cent). While men predominated in the past, their number has now become insignificant.

Residential areas of workers employed at Kolomna machinery plants (contours comprise villages in which at least 5 workers live)

1 - textile-machine plant
2 - heavy machine-tool plant
3 - Diesel locomotive plant

The city of Shchurovo is separated from Kolomna by the Oka River, but the presence of two bridges and bus and suburban railroad service insures close connections between the two cities.

Shchurovo industries produce primarily building materials. The largest factory is the cement mill. Its labor force includes only 3 per cent Kolomna

natives, and even fewer Kolomna residents (0.5 per cent). On the other hand, employees of the Kolomna machine-building plants reside in Shchurovo. The number of such commuters is about equivalent to the entire labor force at the Shchurovo cement mill. Shchurovo is thus a satellite city with respect to Kolomna.

The Kolomna machine plants require skilled, educated workers. On the other hand, cement making does not have such special needs except for a small number of skilled occupations. Few workers at the Shchurovo mill have more than a seven-year education. The specific character of cement production has thus affected the location of the labor-supply area. Most of the workers (68 per cent) were born outside of Shchurovo and Kolomna Rayon. While natives of the Central Industrial Region make up more than 80 per cent of employees at the Kolomna machine plants, their share is 71 per cent at the Shchurovo mill. The mill also employs a large number of natives of Ryazan' Oblast (almost one out of five) and of Lukhovitsy Rayon of Moscow Oblast (11 per cent). In contrast to the workers of the Kolomna machine plants, nearly all the cement workers live in Shchurovo. This is explained by the cement mill's greater housing-construction program, which enables it to settle workers near the mill.

The city of Ozery, like the two other cities, also has a specific industrial specialization. (The formation of the population of Ozery has already been discussed in Yu. G. Saushkin's article "Integrated field-work practice of geography students in Ozery Rayon," Uchenyye zapiski of the Moscow State Pedagogic Institute named for V. I. Lenin, Vol. 54, No. 1, Moscow, 1949.) Ozery is a textile town with a large predominance of female residents since the town has no other industries. The textile mill employs 62 per cent of the town's working population and 90 per cent of its industrial workers.

The normal sex distribution of the population is usually disturbed in cities whose industries employ primarily women; this is especially true for the 18-to-50 age group. The low percentage of males is due to the fact that they cannot find employment in such cities upon reaching working age and move elsewhere.

There is a high turnover among plant personnel, especially among young women. Girls who start work at the age of 18 or 19 usually leave town after a few years, settling in areas with a more normal sex distribution of the population. As a result cities of that type grow slowly.

All this applies to Ozery and to the Ozery textile mill, which suffers from a chronic labor shortage. Since the shortage cannot be met by the local population, labor is recruited from distant areas. The weaving and spinning departments of the mill, with the highest percentage of women (82 and 86 per cent respectively), have the most widely scattered labor-supply area. The share of natives of Ozery town and Ozery Rayon in these departments is less than 50 per cent; the Central Chernozem oblasts and the western

oblasts of the Central Industrial Region are well represented. The departments that employ more men draw on a more limited labor-supply area because men are usually recruited from the local population. In the chief engineer's section, where men are in the majority, natives of Ozery town and Ozery Rayon make up 66 per cent of the employees, and in the construction section 77 per cent. The share of local natives is also high in the finishing department, where work requires higher skills (dyeing and printing). More than 90 per cent of the total labor force of the mill lives in Ozery town, with one-fifth of the total residing in women's dormitories.

The workers' settlement of Beloomut occupies a special position among the urban centers discussed in this paper. Its largest enterprise is a garment factory. On the north and south the settlement is bounded by sparsely settled areas. The Oka River separates it form the more densely inhabited part of Lukhovitsy Rayon; the river's bend at this point hampers communications with Beloomut. In the absence of bridges, river crossings are handled in the summer by boats and a ferry, and in the winter by motor vehicles crossing the ice. These crossings are virtually halted during the break-up of the ice and the flooding of the Oka River. The traditional occupation of Beloomut's population is tailoring, dating from before the 1861 emancipation of serfs. This particular occupation developed apparently because of the isolation of the town. The combination of two factors, the geographical isolation and the traditional work habits of the population, have limited the labor supply area and most of the town workers are natives of Beloomut. In view of the transportation difficulties all the workers live in town.

The formation of an area supplying engineers and technicians differs in several respects from the formation of an area providing ordinary workers.

Technical personnel are obtained in two ways. The first is by training promising ordinary workers. That category is made up largely of natives of the local area. The second is by planned recruitment of graduates from higher educational institutions in various cities. These general principles are affected by several conditions in each particular case: (a) the share of local workers that advances to technical positions depends on the technical requirements of the given enterprise and the level of skills of the local workers; (b) the presence of educational institutions in the given town that may train the required technical personnel; (c) the wage scale at the given plant and its housing conditions; (d) other material and cultural conditions in the given urban center.

As an example we might examine the formation of the area supplying engineering and technical personnel to the weaving and finishing departments of the Ozery textile mill. The share of natives of Ozery town and Ozery Rayon among the technical personnel of the weaving department is higher than among the ordinary workers. This is explained by the fact that many technicians and engineers were advanced from among native workers in the 30-plus age group. A reverse situation is found in the finishing department, which requires technical and engineering skills found mainly among graduates

of the country's principal textile-engineering schools of Moscow, Ivanovo and other major textile centers.

In conclusion, a few words whould be said regarding the practical need for studying migration processes. (The author completely shares the point of view expressed in articles by Yu. G. Saushkin (Geografiya v shkole, 1958, No. 6) and S. A. Kovalev, E. A. Lyamin and A. I. Pekel' (Voprosy geografii, No. 38, 1958) regarding the need for such studies.) Industries and occupations differ in their labor-force requirements. Proper investigation of these requirements in the planning of new factories provides a better approach to labor recruitment on the basis of existing work skills of the population. Planners should provide a combination of factories and plants that would not disturb the normal sex distribution of the population of the future town or city and thus would not produce out-migrations contrary to the national interest.

In that connection migration processes should be studied on a nationwide scale. Several key areas should be set aside in each economic region for detailed investigation of the character of migration processes. The data obtained from such a study would make it possible to assess the volume and directions of migration in the country as a whole and assist planning agencies in taking account of these processes in their plans for the development of economic-geographic and administrative-economic regions.

CHANGES IN THE GEOGRAPHY OF POPULATION CENTERS IN CONNECTION WITH CREATION OF THE TSIMLYANSK RESERVOIR

By M. N. Khromov

(From Izvestiya Vsesoyuznogo Geograficheskogo Obshchestva, 1961, No. 1, pp. 79-81)

(Abstract: The author discusses some of the problems involved in the resettlement of population from lands flooded by the filling of the Tsimlyansk Reservoir on the lower Don River in 1952 in connection with construction of the Volga-Don Canal.)

A substantial number of river development projects in the Soviet Union are situated in lowlands and plains. Under these conditions the creation of large dams and reservoirs usually results in the flooding of large areas and their removal from economic utilization.

The construction of large reservoirs always involves the transfer of a substantial number of population centers from the area of the future reservoir and the adaptation of the population to new areas of settlement. In the

Изменения в географии населенных пунктов Ростовской и

Changes in the geography of populated places of Rostov and Stalingrad Oblasts in connection with the filling of the Tsimlyansk Reservoir.

ой областей в связи с созданием Цимлянского водохранилища.

Legend:

Conventional Symbols

Cities, workers settlements and rayon seats.
Completely resettled populated places.
Partly resettled populated places.
Populated places untouched by resettlement.
Newly built populated places.
Populated places that received new settlers.
Oblast boundaries.

case of the Rybinsk Reservoir more than 600 places including the town of Mologa, were moved to new sites. In the case of the Kuybyshev Reservoir about 300 places were affected, including the entire town of Stavropol' and part of the town of Zelenodol'sk. In the area of the Bratsk Reservoir there were 238 populated places, including the old town of Bratsk and parts of the towns of Svirsk and Usol'ye-Sibirskoye. Such transfers result in the building of new population centers, usually merging the population of two or more of the old villages. Such new centers often differ sharply in their economic functions from the old populated places. Although the problems involved in changes of settlement and population geography as a result of the construction of large reservoirs are of considerable interest to economic geographers, they are seldom discussed in the literature. In the present paper the author intends to discuss some of the problems involved in the relocation of population from the area of the Tsimlyansk Reservoir.

The Tsimlyansk Reservoir is one of the largest Soviet reservoirs filled in recent years. Its area is 2,686 square kilometers; its length from the Tsimlyansk Dam to the town of Kalach is 183 km., and its width ranges from 3-5 to 38 km. Filling of the reservoir affected three rayons of Rostov Oblast (Tsimlyanskiy, Volgodonskiy and Dubovskiy) and six rayons of Stalingrad Oblast (Kalachevskiy, Oktyabr'skiy, Kotel'nikovskiy, Surovikinskiy, Chernyshkovskiy and Nizhne-Chirskiy) (see map on pp. 58and 59).

The area flooded by the reservoir was in a zone of inadequate moisture supply and bore relatively low and irregular crops. Agriculture was of the grain and livestock type. Industry was poorly developed and consisted mainly of enterprises of the rayon level.

Settlement patterns were related to the inadequacy of the moisture supply, with valley-ravine and valley-gully settlement types predominating. Because of the semi-arid conditions, the southeast part of European Russia was settled and economically developed mainly along the river valleys, including the Don and its tributaries (Chir, Khoper, Medveditsa, Tsimla and others). The settlement of the middle and lower reaches of the Don and its tributaries in the 16th and 17th centuries led to the formation of Don Cossack villages, many of which were preserved up to the time of the filling of the reservoir.

The Cossack villages, or stanitsas, of Tsimlyanskaya, Verkhne-Kurmoyarskaya, Nizhne-Chirskaya and Nizhne-Kurmoyarskaya were more than 300 years old. Out of the 48 original Don Cossack settlements of 1672, eight were in the area of the future reservoir.

The riverine character of settlement in the Don valley and along its tributaries resulted in a relatively high population density in the future reservoir zone, where the density was two to three times higher than the average rural density of 6 to 12 persons per square kilometer in Rostov and Stalingrad oblasts as a whole. The flooded zone therefore contained a relatively large number of populated places. (It is interesting to note that the same

situation exists in the case of other reservoirs; see item 5 of the bibliography.) A total of 172 populated places were affected by the Volga-Don project, 159 in entirety and 13 in part.

Those that were moved entirely to new sites included the former rayon seats of Tsimlyanskaya and Verkhne-Kurmoyarskaya; those moved in part included the town of Kalach, the workers settlement of Krasnoarmeyskiy and the rayon seat of Nizhne-Chirskaya. A total of 49 new populated places were built, of which 37 were mergers of two or more of the former places. This approach to resettlement reduced the total number of populated places in the area by 113, including 39 in Rostov Oblast and 74 in Stalingrad Oblast (see map).

Most of the places were moved only relatively short distances, an average of 13 km. in Rostov Oblast and 10 km. in Stalingrad Oblast. A few places were moved considerably farther. In Rostov Oblast, for example, Nizhne-Kurmoyarskaya was moved a distance of 140 km. to the village of Ryabiche-Zadonskiy in new irrigation lands, and the village of Kulaly was moved 100 km. to Cherkasskiy. In Stalingrad Oblast, the village of Verkhne-Kurmoyarskaya was moved 70 km., and Vatazhnyy 90 km.

Most of the new populated places were built on the shores of the future reservoir at a relatively short distance from previous sites. A substantial number of flooded villages were merged with existing villages situated near the shores of the reservoir. In Rostov Oblast, 18 out of a total of 21 new settlements were situated on the shores of the reservoir, and in Stalingrad Oblast, 23 out of 27 new places. The relatively short transfer distance was due to two factors: (1) the fact that the moving of houses was not economical over distances of more than 20 to 25 km., and (2) the relative ease with which new farmland could be provided for the resettled population in the steppe zone compared with reservoir projects in the forested northern and eastern areas of the country.

The question of land availability and the possibility of creating a diversified agriculture in the resettlement areas were among the principal factors considered in the project.

The filling of reservoirs in the steppe zone usually floods only part of the land of collective farms (mainly hay meadows and pastures) and the population can be resettled on land of the collective farms that is not affected by flooding. In some cases when most of the land of a collective farm is flooded and the rest is inadequate to assure diversified farming possibilities, the population is resettled on the land of a nearby farm. This results in a merged collective farm and farm settlement.

In view of the fact that all the collective farms in the Tsimlyansk Reservoir zone had adequate land resources and, on the contrary, even suffered from a labor shortage, resettlement on the land of other farms has had a beneficial effect on the farm operation.

Altogether only 28 old populated places were merged in Rostov and Stalingrad oblasts in connection with the filling of the reservoir. In forested areas, where reservoirs tend to flood most if not all of the available farmland, resettlement of the population and replacement of the land constitute a far more difficult and expensive problem.

Another characteristic feature of the Tsimlyansk project has been the improvement of the economic-geographic situation and of transportation services of most of the new settlements as well as the old population centers unaffected by the flooding.

The construction of the Volga-Don project has greatly improved navigation conditions. Previously Kalach was the head of navigation, and even so could be reached only by small vessels at low-water stage. There were 44 large sandbars between Kalach and Tsimlyanskaya. The filling of the reservoir has greatly increased the depth and Kalach has become an important river port. Navigation has also been improved on the lower Don, with guaranteed depths of 2.4 to 2.6 meters. The settlements that were moved to the shores of the reservoir thus found themselves on one of the major waterways of the country.

Transportation conditions of both old and new settlements were also improved with the construction of the Morozovsk-Kuberle railroad crossing the Don on the Tsimlyansk dam. Construction of this line has brought many villages considerably closer to the nearest railroad station. While the old settlement of Tsimlyanskaya, for example, was situated 115 km. from the railroad at Tsimla station, the new settlement of Tsimlyanskiy is situated directly on the new line. The distance between the village of Romanovskaya and the nearest railroad has been cut from 50 to 8 km.

There were some cases, however, in which transportation conditions deteriorated. The filling of the reservoir, for example, flooded the floodplain of the Tsimla River, creating a large bay that cut off four villages -- Aksenov, Budarin, Medvedev and Pronin -- from the rest of Tsimlyanskiy Rayon. Under these conditions it was deemed best to move these villages to new sites despite the fact that they had not been directly affected by the flooding. (Similar cases occurred in the case of the flooding of the Rybinsk Reservoir; see (1), p. 135, of bibliography.)

The transfer of populated places to new sites was accompanied by complete reconstruction. The old settlements had been poorly laid out, without any planning. They were scattered chaotically over dissected terraces along the banks of the Don River and its tributaries. These defects were eliminated as a result of their removal to new sites. The Architecture Committee worked out new plans for each settlement based on its future prospects of development. Those prospects were assessed on economic grounds, such as specialization of production. An example is the new workers settlement of Tsimlyanskiy, with broad, straight streets, a fine residential area for powerstation workers, and a palace of rest and culture situated on the high bank

of the Tsimlyansk Reservoir. A newly built food-processing and light manufacturing industry is rapidly developing in the new settlement. After some time the settlement is expected to be raised to city status.

The government has provided assistance to the resettled population. A total of 38 million rubles was allocated alone to the population of Tsimlyanskiy Rayon. Each household received between 7,000 and 30,000 (old) rubles depending on the value of its home and private plot. In addition the sale of building materials to the new settlers was organized on a broad scale. This enabled them to expand their living space and to build three- and four-room homes instead of their old one- and two-room houses, and to provide themselves with good kitchen and bathroom facilities.

The construction of large river-development projects leads not only to the building of new population centers replacing the ones moved from flooded sites, but also to the construction of new settlements not related to resettlement but to the construction and operation of dams and power stations. In the case of the Tsimlyansk Reservoir, such settlements were the town of Volgodonsk, a transportation and industrial center on the reservoir bank, and the workers settlement of Novo-Solenovskiy. Next to Volgodonsk is the new river port of Tsimlyanskiy and one of the nation's largest factories for the production of fatty acids, with an annual capacity of 30,000 tons of fats. The factory makes it possible to release 200,000 hectares from the cultivation of oilseeds. For comparison, it might be noted that the entire area in oilseeds in Rostov Oblast amounted to 169,000 hectares in 1957.

These are some of the problems related to changes in settlement geography of Rostov and Stalingrad oblasts in connection with the construction of the Tsimlyansk Reservoir.

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NEWS NOTES

By Theodore Shabad

Ekibastuz Coal Basin Expansion. The construction of a third surface mine with a capacity of 3 million tons of coal began at Ekibastuz in Kazakstan in July 1961. The mine is scheduled to be completed in 1963 (Kazakhstanskaya Pravda, July 2, 1961). The present two surface mines produce about 6 million tons a year compared with an annual output of 25 million tons at Karaganda, Kazakhstan's principal coal mining basin. The expansion plans follow an earlier cutback in Ekibastuz production (Soviet Geography, May 1960, p. 89).

New Cities in Karaganda Basin. New city areas directly under the jurisdiction of Karaganda Oblast have been established in the Karaganda coal basin. They are Abay (formerly called Churubay-Nura), adjoining the Karaganda city limits on the south along the railroad to Balkhash, and Shakhtinsk (formerly called Tentek), adjoining Abay on the west (Kazakhstanskaya Pravda, August 16, 1961). The coal mines of Shaktinsk are expected to supply coking coal to the new Karaganda iron and steel plant. The city area of Abay contains the construction project of Topar steam power plant, one of the largest in Kazakhstan, and Topar limestone quarry supplying fluxing material to the Karaganda steel plant.

Karaganda Steel Plant Progress. The second blast furnace of the plant began operations in June 1961 after having originally been scheduled for completion in December 1960 (Izvestiya, June 24, 1961). Blast furnace No. 1 has been in operation since July 1960. The first coke-oven battery also opened in December 1960. The Karaganda steel plant is designed to become the third major steel base of the Soviet Union, in addition to the Donets Basin and the Urals. (See also Soviet Geography, November 1960, p. 77.)

Temir-Tau Synthetic Rubber Plant Opens. Synthetic rubber production began at Temir-Tau in the Karaganda area of Kazakhstan in November 1961 (Stroitel'naya Gazeta, November 6, 1961). The synthetic rubber is being produced at a calcium carbide plant built in World War II. The addition of a synthetic rubber department was begun as early as 1950, but construction was interrupted from 1954 to 1958. A butadiene unit at the Temir-Tau plant began operations in June 1961. Butadiene is a key component of synthetic rubber, which is apparently being produced at the Temir-Tau plant by the process calcium carbide-acetylene-ethyl alcohol-butadiene.

Dnepropetrovsk Tire Plant Opens. The Dnepropetrovsk tire plant in the Ukraine began operations in August 1961 (Pravda, August 3, 1961). The plant was built under contract with a British concern. Other Soviet tire plants are situated in Voronezh, Kirov and Moscow in European Russia, Yerevan and Baku in Transcaucasia, Omsk and Krasnoyarsk in Siberia.

Ukrainian Iron Mine Under Construction. Work has begun on the development of recently discovered iron deposit near the south shore of the Dnieper River's Kakhovka Reservoir, 40 miles southwest of Zaporozh'ye. The so-called No. 1 Iron-ore Combine is situated near the village of Bol'shaya Belozerka. Reserves are given as 300 million tons, with half reported to be of high grade (66 per cent iron). A residential town for iron-mine workers is being built at Balki, on the south shore of the reservoir, 15 miles from the mine (Pravda, July 6, 1961, October 12, 1961). A railroad linking Vasil'yevka, south of Zaporozh'ye, and Veseloye, on the Kakhovka branch, is under construction and will serve the new iron-mining area.

Power Line to Far East Tin Mines Completed. A power transmission line has been completed between a thermal power station at the coal-mining center of Suchan, east of Vladivostok, and the tin mines and concentrators of the Tetyukhe-Kavalerovo area (Sovetskaya Rossiya, July 2, 1961). Construction of the power line through the difficult terrain of the Sikhote-Alin mountains began in 1957. Meanwhile it was announced that a new tin center is under construction at Tayezhnyy, east of Iman (Sovetskaya Latviya, October 6, 1961).

Work on Chardara Reservoir Starts. Work is under way on the Chardara project on the Syr Darya in southern Kazakhstan near the border of the Uzbek SSR (Kazakhstanskaya Pravda, August 23, 1961; Pravda Vostoka, October 7, 1961). The construction of an 80-foot-high, three-mile-long earth dam near Chardara is expected to create a reservoir forty miles long and twenty miles wide. The overflow from the reservoir is planned to feed a new irrigation network in the Kzyl-Kum desert or to spill into the Arnasay depression, an old left-bank channel of the Syr Darya. Construction on the project is expected to be speeded with completion in October 1961 of the Dzhetysay-Chardara railroad, a 40-mile spur that will carry building materials to the project site. The railroad connects at Dzhetysay with the Syr-Dar'inskiy-Dzhizak railroad, opened in 1960.

Bratsk Hydroelectric Station Starts Power Generation. The first 225,000-kw. turbine of the 4,500,000-kw. Bratsk hydro plant on the Angara River began to generate power in October 1961 (Sovetskaya Rossiya, October 28, 1961). Three more turbines are expected to be installed by the end of the year. The Bratsk station, which is expected to furnish cheap power for a new complex of power-oriented industries in the Bratsk area, is the second hydroelectric station on the Angara River. The first, with an installed generating capacity of 660,000 kw., is situated at Irkutsk itself. A third Angara hydro plant is to be built at the mouth of the Ilim River below Bratsk (see Soviet Geography, January 1961, p. 77). Among the power-oriented industries based on the Bratsk power station is a large aluminum plant, on which construction has begun at Anzeb in the Bratsk area (Sovetskaya Torgovlya, August 19, 1961).

Takhia-Tash Power Plant Opens. The Takhia-Tash thermal power station situated on the lower course of the Amu-Darya in Central Asia began to

generate electricity in July 1961 (Stroitel'naya Gazeta, July 30, 1961). Although relatively small -- its first section will have a capacity of 24,000 kw. -- it is the largest producer of electric power in the oases along the lower Amu Darya on the south shore of the Aral Sea. The station will supply power to the cottonseed mills, gins and other industrial establishments of the Kara-Kalpak ASSR, Khorezm Oblast of the Uzbek SSR and Tashauz Oblast of the Turkmen SSR. Takhia-Tash is the site of the original headworks of the Great Turkmen Canal once planned through the Kara Kum desert. The canal project was abandoned in 1953.

Dam of Votkinsk Power Station Completed. The dam of the 1,000,000-kw. power plant south of Votkinsk on the Kama River was completed in October 1961 (Pravda, October 7, 1961). It is expected to start generating power with the installation of two turbines before the end of 1961. The designed capacity of the Votkinsk station, situated at the construction settlement of Chaikovskiy, was raised from an original plan of 540,000 kw. to 1,000,000 kw. The Votkinsk station is the second power plant on the Kama River, the first, just above Perm', having been completed to its full designed capacity of 504,000 kw. in 1956.

Dnepropetrovsk Steam Power Plant Completed. The power plant, situated at Pridneprovskoye, on the left bank of the Dnieper east of Dnepropetrovsk, has reached its full designed capacity of 1,200,000 kw. The plant burns natural gas piped from the Shebelinka field south of Khar'kov (Stroitel'naya Gazeta, August 27, 1961).

Progress on East European Oil Pipeline. The first section of the Volga-Central Europe pipeline was completed in October 1961. It extends from a temporary rail terminal at Brody, east of L'vov to the refinery at Bratislava in Czechoslovakia (see earlier reports on this pipeline in Soviet Geography, June 1960, p. 76; January 1961, p. 79). Work has begun on a 450-km. northwest branch of the Volga-Central Europe pipeline to the oil refinery under construction at Polotsk in Belorussia. The Polotsk branch will leave the trunk line near Bryansk (Pravda, July 8, 1961).

Oil Refinery Planned at Kirishi near Leningrad. An oil refinery is to be built at Kirishi, 60 miles southeast of Leningrad on the Volkhov River (Leningradskaya Pravda, September 27, 1961). The refinery will obtain crude oil from the Tatar fields by pipeline via Gor'kiy and Yaroslavl'. Kirishi, now a small settlement at a rail junction, is planned to be expanded into a city of 80,000.

Uzbek Nonferrous Metals Center Expands. A copper concentrator began operations at Almalyk, southeast of Tashkent, in July 1961 (Pravda Vostoka, July 2, 1961). The concentrator is part of a copper-and-molybdenum combine under construction at Almalyk and based on ore mined at nearby Kalmakyr. Completion of the copper smelter is expected in 1963. In addition to the copper-molybdenum complex, Almalyk also is the site of the Altyn-Topkan lead-and-zinc surface mine and concentrator. Almalyk had a population of 41,900 in the 1959 census.

Titanium Plant Under Construction in Kazakhstan. A titanium plant is under construction at Ust'-Kamenogorsk in eastern Kazakhstan (Trud, September 20, 1961). It is planned to ship titanium concentrate to the plant from the Ukraine (Kazakhstanskaya Pravda, July 24, 1957; see also Soviet Geography, March 1961, p. 81). A magnesium plant is to be combined with the titanium plant at Ust'-Kamenogorsk.

Kotlas Mill Starts Pulp Production. The pulp and paper mill under construction at Koryazhma, on the Vychegda River near Kotlas, began producing wood pulp in August 1961 (Stroitel'naya Gazeta, August 16, 1961). (For further details see Soviet Geography, April 1961, p. 59; May 1961, p. 81).

Moscow-Irkutsk Railroad Electrified. Electrification of the Trans-Siberian Railroad from Moscow to Irkutsk was completed in October 1961 (Pravda, October 11, 1961). The 3,300-mile line passes through Ryazan', Kuybyshev, Chelyabinsk and Omsk. The last 170-mile gap to be electrified between Moscow and Lake Baykal was the section Makushino-Isil'-kul. The total mileage of electrified railroads in the Soviet Union is about 9,000 out of a total net of 80,000 miles. The entire system is to be converted to diesel or electric traction by 1970.

Name Changes of "Stalin Cities". In the wake of accusations against Stalin at the Twenty-second Congress of the Soviet Communist party, places bearing Stalin's name were renamed in November 1961. Stalino became Donetsk, for the Donets Basin in which the city is situated (Pravda, November 10, 1961); Stalinsk re-adopted the name Novokuznetsk (which it had before 1932), for the Kuznetsk Basin in which it lies (Sovetskaya Rossiya, November 10, 1961); and Stalingrad was renamed Volgograd (Pravda, November 11, 1961).

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